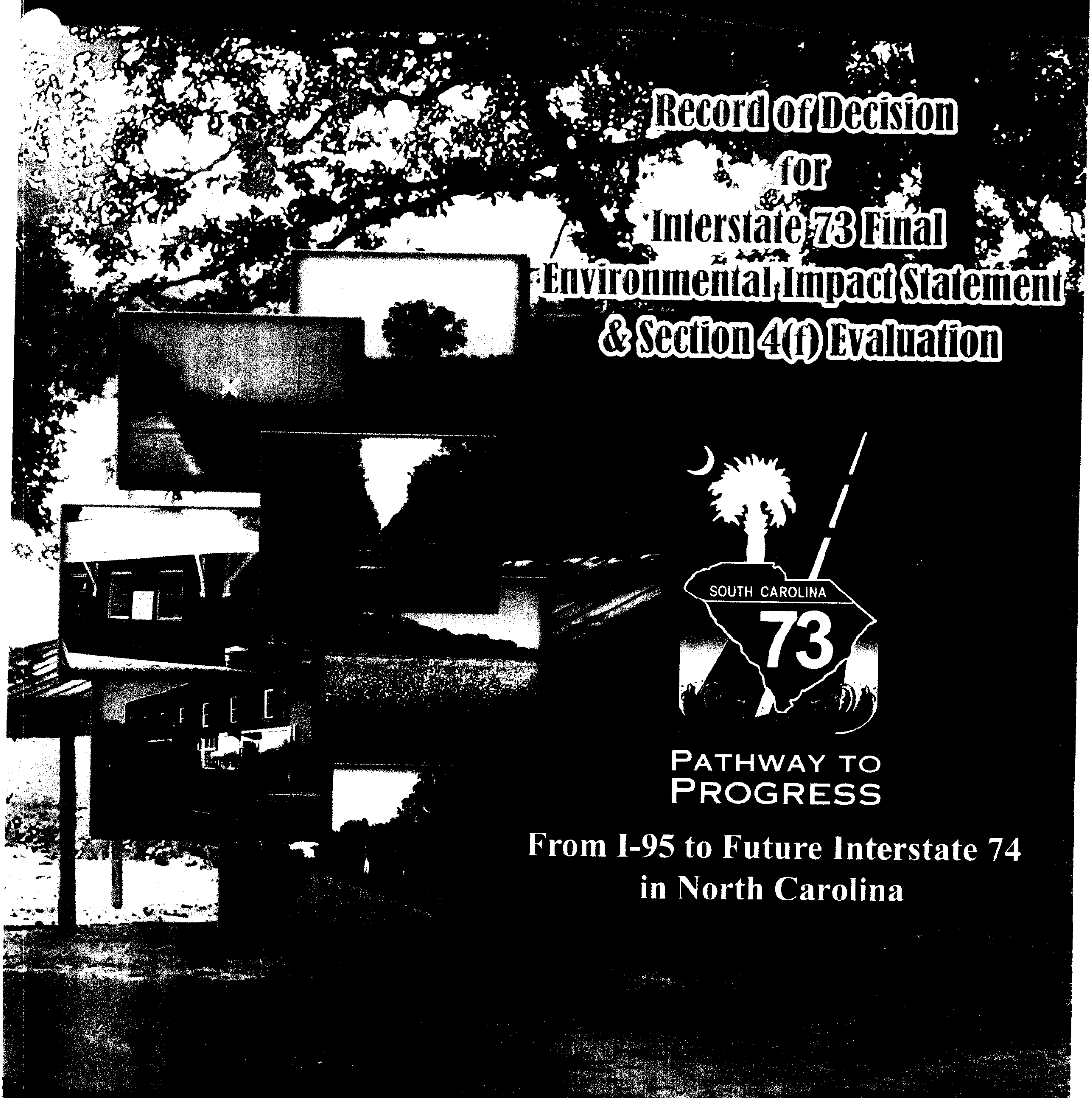


Record of Decision for Interstate 73 Final Environmental Impact Statement & Section 4(f) Evaluation

SOUTH CAROLINA
73
PATHWAY TO PROGRESS

From I-95 to Future Interstate 74 in North Carolina

U.S. Department of Transportation
Federal Highway Administration

SCDOT

I-73 NORTH FINAL ENVIRONMENTAL IMPACT STATEMENT RECORD OF DECISION

What Decision Was Reached?

The South Carolina Department of Transportation (SCDOT), in association with the Federal Highway Administration (FHWA), proposes to construct Interstate 73 (I-73) on new alignment in northeastern South Carolina. An Environmental Impact Statement (EIS) was prepared, along with a Final Section 4(f) Evaluation (refer to Attachment A). The project study area extends northwest from I-95, is bounded to the east by the North Carolina/South Carolina state line up to southern Richmond County (North Carolina) and eastern Scotland County (North Carolina) where it extends to I-74. The western boundary of the study area is the eastern edge of the Great Pee Dee River floodplain. There would be interchanges at I-95, S.C. Route 34, S.C. Route 381, U.S. Route 15/401, S.C. Route 79, N.C. Route 1803, and I-73/74 in North Carolina. Since approximately four miles of the proposed project would be located in North Carolina, the North Carolina Department of Transportation (NCDOT) agreed to collaborate, by a resolution between SCDOT and NCDOT. An estimated 400-foot wide right-of-way would be acquired where frontage roads would be needed. Where frontage roads are not required, an estimated 300-foot wide right-of-way would be adequate.

The Selected Alternative is "Alternative 2." Alternative 2 was selected because, when compared with the other alternatives in the Draft EIS, it best satisfied the Purpose and Need and would have the least amount of wetland impacts (114.3 acres), the least impact to total farmland (1,505 acres), the least impact to prime farmland (805 acres), the lowest cost, low relocations, would not directly affect any known historic resources, be in close proximity to existing infrastructure, would be centrally located to serve the communities of the project study area more equally, and is supported by agencies, local governments, and the public. The three Reasonable Build Alternatives all have some features that are favorable and advantageous, but when compared with Alternative 2, the other Reasonable Build Alternatives were less suitable. Since the Draft EIS was prepared the State Historic Preservation Officer (SHPO) designated one structure, the former Beauty Spot Motor Court Office Building, eligible for listing on the National Register of Historic Places (NRHP) and identified seven archaeological sites as potentially eligible for listing. After refinements to the alignments that resulted from comments received on the Draft EIS, the impacts for the Selected Alternative changed (refer to the first full paragraph on Page 2).

Which Alternatives Were Considered?

The Final EIS studied in detail the following alternatives: the No-build Alternative, and three Reasonable Build Alternatives (Alternative 1, 2, and 3). Federal and state regulatory agencies provided information pertinent to their particular areas of expertise throughout the EIS process and participated in the selection of the data layers used by the Corridor Analysis Tool (CAT). There were 14 meetings with the Agency Coordination Team and 6 meetings with the North Carolina Interagency group to develop and evaluate the alternatives. Initially, there were over 1,800 potential alternatives developed for this project. Many of the preliminary alternatives were eliminated because they did not meet the Purpose and Need or had extensive environmental impacts (refer to Chapter 2 of the Final EIS). Further evaluation reduced the alternatives to three primary corridors with segments that allowed some interchangeability between them that made it possible to combine the corridors in different ways. This process led to the three Reasonable Build Alternatives that, along with the No-build Alternative, received an additional level of analysis and coordination efforts.

The Final EIS contains an adequate description of the project's Purpose and Need, the alternatives, and the impacts. The impacts for the Selected Alternative have changed as a result of modifications to the alignment made based upon comments received, as well as detailed surveys of the alignment corridor. The detailed analyses of the major environmental impacts have been summarized in the Executive Summary of the Final EIS. The environmental consequences that would result from implementation of the proposed action are impacts to wetlands of approximately 57.2 acres (plus approximately 5,188 linear feet of perennial stream impacts), loss of 849 acres of prime farmland, the potential relocation of 24 residences and four commercial establishments, and potential noise impacts to eight residences and one business.

The Purpose of the proposed project is to provide an interstate link between proposed I-73, between I-95 and the Myrtle Beach Region, and the North Carolina I-73/I-74 Corridor. The primary Needs for the project are to provide system linkage and to enhance economic opportunities in the project study area, while the secondary Needs are to improve access for tourism, improve safety of existing roadways, and provide multimodal planning. The No-build Alternative would fail to satisfy the stated Purpose and fulfill the primary and secondary Needs for the project.

The No-build Alternative would not provide:

- **A direct link between I-95 and the North Carolina I-73/I-74 Corridor to improve system linkage.** I-73 has been named as a High Priority Corridor (number five) by the U.S. Congress. This section of I-73 is needed to provide the connection between North Carolina and I-95. Without this link, the planned High Priority Corridor between Michigan and South Carolina would not be completed;

- **Opportunities for economic growth.** The interstate would provide economic opportunities to the project study area that would result from the connectivity to the interstate system. Dillon and Marlboro Counties in South Carolina are two of the most economically depressed counties in the state. They have high unemployment and low income levels. The trend in Marlboro County has been for negative population growth over the past 20 years. I-73 is seen locally as a key to improving the economic prospects within the project study area;

- **Improved access for tourism.** The construction of the interstate would result in savings to the traveling public resulting from increased travel efficiency. This travel efficiency is reflected in reduced travel times. A key to maintaining and improving tourism is the ability of tourists to easily access destinations. The connection provided by I-73 would increase the travel efficiency for tourists traveling through North and South Carolina;

- **Improved safety on local roads.** The diversion of traffic to the interstate from the local road network that would result from the construction of the proposed interstate would improve safety on the local network by removing the vehicles making through trips. This would take persons unfamiliar with the local roads off of that network and put them on the interstate, a more familiar situation for those traveling long distances. It would also remove truck traffic from the local network; or,

- **A future provision for a multimodal facility.** The I-73 Corridor includes within the proposed right-of-way the potential for two rail corridors that would allow for future passenger and/or freight rail. This has the potential for providing additional rail connectivity to northeastern South Carolina.

The No-build Alternative would not provide the interstate link between I-73 at I-95 and the North Carolina I-73/I-74 Corridor. Failure to provide this link would lead to the loss of economic opportunities, the potential loss of tourism, longer travel times, and the loss of the multimodal opportunities provided by the corridor.

Would the Project Impact any Section 4(f) Resources?

The Final Section 4(f) Evaluation is included with this Record of Decision (refer to Attachment A). Based on the Final Section 4(f) Evaluation, one site, the Beauty Spot Motor Court Office Building (Resource 031 0011) near Bennettsville, South Carolina, was identified within or adjacent to the Selected Alternative. This determination of eligibility was made after the publication of the Draft EIS. No other historic structures, parks, recreational facilities, or wildlife refuges were found within or adjacent to the Selected Alternative.

A plan for mitigation of the impacts to the Beauty Spot Motor Court Office Building has been developed in coordination with the SHPO and a Memorandum of Agreement was signed July 2008 (refer to Attachment B).

As noted earlier, since the publication of the Draft EIS there have been seven archaeological sites identified by the SHPO in South Carolina as potentially eligible for listing on the NRHP. These sites will be further evaluated and, if necessary, measures to avoid the sites or data recovery will be performed at the eligible sites. A Memorandum of Agreement was executed in September 2008 between SCDOT, SHPO, and FHWA (Attachment C) that formalized this agreement.

Were any Measures Adopted to Minimize Environmental Harm?

All practicable measures to minimize environmental harm have been incorporated and are detailed in the Executive Summary as Environmental Commitments. These include:

- In the event I-73 is tolled, additional *National Environmental Policy Act* analysis would be performed.

- A minimum design speed of 45 miles per hour, where appropriate, is necessary to be maintained in construction areas in order to minimize undue traffic backups and delays.

- Relocation will be conducted in accordance with the *Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970*, as amended. Relocation resources will be available to all relocates without discrimination.

- Bridges constructed to elevate roadways over the interstate would have 10-foot shoulders, which would accommodate pedestrians and bicyclists safely.

- In the event that previously unknown cultural resources are discovered during construction, the resources will be handled according to *36 CFR §800.11* in coordination with the State Historic Preservation Office and appropriate Tribal Historic Preservation Offices.

- Detailed archaeological investigations will be completed on the Selected Alternative in North Carolina prior to purchase of right-of-way.

- Mitigation for the impacts to the former Beauty Spot Motor Court office will be performed in accordance with the terms in the signed Memorandum of Agreement between the SHPO and SCDOT (refer to Attachment B).

- Phase II archaeological testing will be performed on seven sites in South Carolina determined to be potentially eligible for listing on the NRHP. If any of these sites are found to be eligible for listing, then avoidance will be evaluated and/or mitigation will be performed (refer to Attachment C).

- Should previously unknown hazardous material contamination be discovered as the project moves forward, the contamination would be removed and properly disposed of prior to the initiation of construction activities at that site.

- The contractor will comply with applicable federal, state, county, and other local air pollution regulations during the construction of the project.

- The Selected Alternative will cross the five major riparian wetland systems (Little Reedy Creek, unnamed tributary to Little Reedy Creek, Hagins Prong, Cottingham Creek, and Beverly Creek) primarily on structure. Hydraulic studies during final design will determine whether the minor crossings of ten unnamed tributaries of Crooked Creek will be piped or culverted.

- A more detailed screening was performed within a one-mile wide corridor along the Selected Alternative and it was determined that sufficient upland areas that could be utilized for borrow activities appear to be present in close proximity to the Selected Alternative alignment. Wetland areas should not be used for borrow areas. Borrow activities will be done in accordance with the SCDOT Engineering Directive (EDM- Borrow Pit Location and Monitoring).

- Where appropriate, pipe and culvert bottoms would be recessed below the bottom of perennial stream channels to allow movement of aquatic species through the structure.

- If temporary roads in wetlands are used for bridge construction, the fill material would be removed and the areas reseeded with native riparian species seed mixes.

- Best Management Practices in accordance with local, state, and federal guidelines will be incorporated during the design and construction of the project to minimize impacts to water quality and wetlands.

- Preventive measures will be taken to minimize the spread of invasive plant species.

- A Spill Prevention, Control, and Countermeasures Plan will be developed to address potential impacts from construction activities.

- In the event that a geodetic control monument would be impacted, notification would be provided to the National Oceanic and Atmospheric Administration no less than 90 days in advance of such activities in order to plan for their relocation.

- The results of the noise analyses will be given to local governments to aid in future planning in their respective areas.

- Where practicable, 2:1 side slopes were used that reduced the roadway footprint through wetlands and other sensitive areas and thus reduced the impacts.

- A Section 404 permit from the U.S. Army Corps of Engineers and a Section 401 Water Quality Certification from S.C. Department of Health and Environmental Control will be obtained for unavoidable impacts to wetlands and waters of the United States and mitigation will be completed for these impacts.

- Modifications, such as the installation of coffer dams in stream channels in order to construct footings for bridge pilings, may be required. However, if these modifications were needed they would be temporary and removed upon completion of construction and the natural grade of the wetland restored and reseeded.

- Construction activities will be confined within the permitted limits to prevent the unnecessary disturbance of adjacent wetland areas.

- During construction, potential temporary impacts to wetlands will be minimized by implementing sediment and erosion control measures to include seeding of side slopes, silt fences, and sediment basins, as appropriate. Other best management practices would be required of the contractor to ensure compliance with the policies of *23 CFR 650B*.

Has a Monitoring of Enforcement Program Been Adopted?

The SCDOT and FHWA will ensure that the Environmental Commitments made in the Final EIS or developed subsequent to the Final EIS in the final design, related to human or natural environmental issues, are carried out.

What Comments Were Received on the Final EIS?

Four comment letters were received on the FEIS. A letter was dated September 2, 2008 from SCDHEC, Bureau of Land and Waste Management, another was dated September 22, 2008 from SCDHEC, Bureau of Air Quality, one was dated September 22, 2008 from the National Marine Fisheries Service (NMFS), and one was dated September 22, 2008 from the USEPA. In addition, the Catawba Indian Nation provided comments on the FEIS. Specific comments were raised in the letters.

SCDHEC Bureau of Land and Waste Management

Comment: They advised that "the Division of Waste Management does not anticipate potential concerns from the proposed project to any RCRA facilities in the project area regulated under the South Carolina Hazardous Waste Management Regulations."
Response: Comment noted.

SCDHEC Bureau of Air Quality

Comment: They stated: "…the proposed project is located in Marlboro and Dillon Counties which are both in attainment for the six criteria pollutants outlined in the National Ambient Air Quality Standards (NAAQS) and therefore not subject to transportation conformity. Please bear in mind though, the EPA tightened the standard for ground-level ozone in March 2008 and the boundaries for the nonattainment areas have not yet been established. Therefore, areas of the State currently in attainment could be affected."

Response: Comment noted.
Comment: They requested: "...that work practices minimizing the generation of particulate matter and ozone-forming emissions be considered."
Response: A commitment made for the project on page 3-135 of the FEIS is that "The contractor will comply with applicable federal, state, county, and other local air pollution regulations during the construction of the project."

National Marine Fisheries Service

Comment: The NMFS stated that: "the comments provided by NMFS have been adequately addressed in the FEIS with the exception of our recommended (sic) to include the Atlantic sturgeon (*Acipenser oxyrinchus*) in the sections of the Final EIS and Biological Assessment that discuss potential impacts to endangered or threatened species." They also recommended that: "both the shortnose and Atlantic sturgeon be included in the Biological Assessment for consideration during the completion of the ESA consultation."
Response: Concurrence with the findings of the Biological Assessment (BA) that the proposed project would not affect federally protected species was received from the U.S. Fish and Wildlife Service on August 6, 2008 (refer to Attachment D). According to NMFS, the Atlantic sturgeon has "similar riverine distributions, habitat use patterns, and limiting factors" as the shortnose sturgeon. It was determined that riverine habitat suitable for use by the shortnose sturgeon would not be impacted by the project, therefore it is anticipated that no impacts would occur to the Atlantic sturgeon. However, the Atlantic sturgeon was not addressed in the EIS and BA, even though the National Marine Fisheries Service (NMFS) had requested it, because it has not yet been listed as an endangered, threatened, or candidate species under the Endangered Species Act.

U.S. Environmental Protection Agency

Comment: USEPA is concerned about the compensatory mitigation plan. They referred to the *Compensatory Mitigation for Losses of Aquatic Resources; Final Rule* that establishes detailed requirements of project-specific compensatory mitigation plans. They referred to a "provisional" Section 404 permit and that "The Rule states that the preferred approach for compensatory mitigation is to use mitigation banks, with a less desirable substitute being established in-lieu fee mitigation programs." They stated that: "The validity of a Section 404 permit issuance (provisional or otherwise) that does not comply with the Rule is questionable."
Response: We have not found language in the *Final Rule* that precludes the use of the proposed mitigation process on the I-73 project. In fact, the *Final Rule* endorses the use of an in-lieu fee program over permittee-responsible mitigation in service areas where no mitigation banks exist [§ 332.3(b)(3)]. The proposed *Draft I-73 Wetland and Stream Mitigation Process* (Process) document, which was drafted by the Project Team and modified by the I-73 interagency review group (Agency Coordination Team, ACT) after several meetings, describes the framework for a mitigation methodology that is essentially an in-lieu fee program. However, the Process describes

a project specific in-lieu fee program with detailed requirements as to how the fund would be established, how it would be administered, how mitigation credits are to be calculated, etc.

The proposed Process is a framework for the in-lieu fee program. It has several details that can not be finalized until a suitable mitigation site(s) have been identified. However, the *Final Rule* indicates that "the level of detail necessary for the compensation planning framework is at the discretion of the district engineer, and will take into account the characteristics of the service area(s) and the scope of the program. As part of the in-lieu fee program instrument, the compensation planning framework will be reviewed by the Interagency Review Team [IRT], and will be a major factor in the district engineer's decision on whether to approve the instrument." [§ 332.8(c)(3)] The initial review of the Process by the ACT, which includes the affected resource and regulatory agencies has generally been favorable.

Most of the key issues and/or requirements relating to in-lieu fee programs found in the *Final Rule* are currently addressed in the proposed Process, including the following:

•The *Final Rule* defines suitable mitigation plans as using the watershed approach and by improving overall ecological function (landscape scale) [§ 332.2(b)(1), § 332.3(c)(1), § 332.3(c)(2)(i), § 332.8]. As indicated in Section 7 of the Process, this approach has been identified as the approach to be taken and was endorsed by the I-73 ACT.
•The *Final Rule* calls for the establishment of an Interagency Review Team, which would be equivalent to the Mitigation Advisory Board [§ 332.2 Definitions, § 332.8(b)(1)-(5)] that is proposed in the Process.
•The *Final Rule* requires the preparation and preliminary review of a prospectus, which outlines the framework of the in-lieu fee program [§ 332.8(d)(1)-(3)]. Based on the description of the prospectus in the *Final Rule*, the proposed Process document would serve as the prospectus and the preliminary review and approval has been performed by the ACT.
•The *Final Rule* calls for the prospectus to be placed on public notice for review and comment [§ 332.8(d)(4)&(5)]. This would be done with the Process as part of the Section 404 permit public notice process.
•A banking instrument is required for in-lieu fee programs [§ 332.8(d)(6)-(8)], however, since the Process describes a project specific mitigation approach for a single project and where mitigation credits required for impacts and generated by the mitigation site would be based on the USACE Standard Operating Procedure (SOP), a banking instrument should not be required.
•A dispute resolution process is outlined in the *Final Rule* [§ 332.8(e)] and one has been prepared for use by the Mitigation Advisory Board in the Process as well.
•According to the *Final Rule*, a detailed mitigation plan must be prepared once a suitable site(s) has been identified [§ 332.8(j)(1)]. This also is required in the Process.

• For in-lieu fee programs the *Final Rule* specifies that land acquisitions and initial improvements must be completed by the third full growing season [§ 332.8(n)(4)]. The Process contains a mitigation schedule in which all of the fund must be spent on wetland and stream mitigation within two years of commencement of construction of I-73. It is anticipated that the southern portion of I-73 (I-95 to SC Route 22) would be constructed first. Therefore, impacts to wetlands and streams associated with the northern portion of the project could actually be mitigated in advance of construction.

• § 332.8(o)(1)-(7) of the *Final Rule* discusses how mitigation credits are to be determined and what costs should be included in the cost per mitigation credit. The *Final Rule* [§ 332.8(q)(2)] explains the monitoring report requirements and long-term management funding. The Process describes how mitigation credits would be calculated and how the cost per credit would be determined. Because the credit costs would be based on the mitigation bank credit cost at the time the mitigation fund is established, cost for acquisition, mitigation planning, mitigation implementation, monitoring, and long-term management would be included in those per credit costs.

• The *Final Rule* [§ 332.8(t)(2)] describes requirements for site protection to be in place prior to the release of credits from an in-lieu fee program. Again, because the proposed Process is a project specific program where the mitigation site(s) would be acquired up front, then this requirement should not apply. As described in the Process, long-term site control would be turned over to a conservation group or state agency for protection.

Comment: It was stated that: "commercial mitigation banks should not be eliminated for consideration for providing at least some of the mitigation for I-73".
Response: The use of commercial mitigation banks was incorporated into the proposed Process in the December 2007 ACT meeting.

Comment: It was stated that construction methodology has not yet been identified and that this could affect wetlands.
Response: The limits of proposed fill and bridging were identified and, if made part of the permit, could not be exceeded without modifying the permit. Techniques for construction have not been established, but would be defined in a Section 404 permit application.

Comment: It was noted that the project may impact eight residences and one business and that noise impacts should be minimized and "reasonably mitigated".
Response: That there are only eight residences and one business that would have noise impacts for a road that is over 36 miles long is reflective of the efforts to minimize noise impacts. The potential impacts were evaluated under the *Noise Abatement Policy* for both NCDOT and SCDOT, both of which have been approved by the FHWA. These policies required that the mitigation of potential noise impacts were evaluated for feasibility and reasonableness.

Catawba Indian Nation

Comment: If any of the archaeological sites mentioned on page 3 of the ROD are found to be significant, the Catawba Indian Nation wants to be notified along with SHPO for the data recovery and mitigation plan.

Response: The Catawba Indian Nation would be notified if any archaeological sites are found to be significant, per Stipulation 4 of the Memorandum of Agreement (refer to Attachment C).

Robert L. Lee, S.C. Division Administrator
Federal Highway Administration
October 22, 2008

H B Limehouse

H.B. Limehouse, Jr., Secretary of Transportation
South Carolina Department of Transportation
October 22, 2008

Attachment A
FINAL SECTION 4(f) EVALUATION
INTERSTATE 73 FEIS: I-95 to I-73/I-74 in North Carolina

1.0 INTRODUCTION

Section 4(f) of the *Department of Transportation Act of 1966*, 49 U.S.C. §303, requires that prior to the use of any land from a publicly owned park, recreational area, wildlife or waterfowl refuge, or historic property or archeological site on or eligible for the National Register of Historic Places (NRHP), it must be determined that there is no prudent or feasible alternative which avoids such use and that the project includes all possible planning to minimize harm to these resources.

Section 4(f) specifies that the Secretary of Transportation may approve a transportation program or project…requiring the use of publicly owned land of a public park, recreation area, or wildlife and waterfowl refuge of national, State, or local significance, or land of a historic site of national, State, or local significance (as determined by the Federal, State, or local officials having jurisdiction over the park, area, refuge, or site) only if:

(1) there is no prudent and feasible alternative to using that land; and

(2) the program or project includes all possible planning to minimize harm to the park, recreation area, wildlife and waterfowl refuge, or historic site resulting from the use.

Section 4(f) further requires consultation with the Department of Interior and, as appropriate, the involved offices of the Department of Agriculture and Housing and Urban Development in developing transportation projects and programs which use lands protected by Section 4(f).

According to the Federal Highway Administration's (FHWA) *Section 4(f) Policy Paper,*[1] a Section 4(f) resource is "used" any of the following ways:

(1) a direct use occurs when "land from a Section 4(f) site is permanently incorporated into a transportation project;"
(2) a temporary use occurs "when there is a temporary occupancy of Section 4(f) property that is adverse in terms of the statute's preservationist purposes;" or,
(3) a constructive use occurs "when the proximity impacts of the transportation project on the Section 4(f) site are so severe that the protected activities, features, or attributes that qualify the resources for protection under Section 4(f) are substantially impaired."

In order for a park, recreational area, or wildlife or waterfowl refuge to qualify for protection under Section 4(f), it must be publicly owned and officially designated as a

[1] FHWA, *Section 4(f) Policy Paper,* March 1, 2005,
http://www.environment.fhwa.dot.gov/projdev/4fpolicy.asp (June 3, 2008).

park, recreational area, or wildlife or waterfowl refuge. When these areas are owned by private institutions and individuals, even if such areas are open to the public, Section 4(f) does not apply. However, the FHWA does strongly encourage the preservation of such privately owned lands.[2]

Historic resources that are listed on or eligible for listing on, the National Register of Historic Places (NRHP) are not required to be publicly owned in order to be protected under Section 4(f). An archeological site must also be on or eligible for the NRHP and important for preservation in place in order to be considered a Section 4(f) site. Determinations of eligibility for the NRHP have been coordinated with the South Carolina State Historic Preservation Office (SCSHPO) and the North Carolina State Historic Preservation Office (NCSHPO).

This Final Section 4(f) Evaluation describes resources affected by the construction of Interstate 73 (I-73), and provides an estimate of impacts. Avoidance alternatives and measures to minimize and mitigate harm are discussed.

The South Carolina Department of Transportation (SCDOT) proposes to construct a new interstate highway, I-73, in Dillon and Marlboro Counties, South Carolina and Richmond and Scotland Counties, North Carolina. The project was developed in close coordination with federal resource and regulatory agencies, as well as their state counterparts from North Carolina and South Carolina. The facility would extend from I-95 in Dillon County to future I-73/I-74 in Richmond County. The road would accommodate a six-lane facility with corridors for future multimodal facilities and allowances for frontage roads, where needed. The interim design, which is proposed to be constructed initially, would provide two lanes of traffic in each direction. In the future, when traffic volumes increase to a point that additional lanes are necessary in order to maintain an acceptable level of service, an additional lane in each direction could be added within the right-of-way corridor. An estimated 400-foot wide right-of-way would be acquired where frontage roads would be needed. Where frontage roads are not required, an estimated 300-foot wide right-of-way would be adequate.

1.1.1 Purpose and Need

The purpose of the proposed project is to provide an interstate link between I-95 and the North Carolina I-73/I-74 Corridor to serve residents, businesses, and travelers while fulfilling congressional intent in an environmentally responsible and community sensitive manner.

The following primary needs have been identified in connection with the proposed federal action:

- **System Linkage** – Improve national and regional connectivity by providing a direct link between the future I-73 segment from I-95 to the Myrtle Beach region and the I-73/I-74 Corridor in North Carolina.

[2] *Ibid.*

- **Economic Development** – Enhance economic opportunities and development in northeastern South Carolina and southeastern North Carolina.

These secondary needs have also been identified:

- **Improved Access for Tourism-** Improve access to and from tourist destinations in eastern South Carolina as well as the Hamlet area of North Carolina.
- **Increase Safety on Existing Roads** – Move significant volume of traffic from local roads to an interstate designed for a higher volume of traffic.
- **Multimodal Planning** – Allow for future provision of a multimodal facility within the Interstate Corridor.

1.1.2 Description of the Preferred Alternative

The Preferred Alternative starts at the northern end of the interchange with I-95, which is the terminus of the Southern Project of I-73, and extends to the northwest on the western side of Bingham, South Carolina where it has an interchange with S.C. Route 34. It continues approximately 3.5 miles northwest before turning north with an interchange at S.C. Route 381. The Preferred Alternative continues northwest with an interchange located at U.S. Route 15/401 east of Bennettsville, South Carolina, then turns north, with an interchange at S.C. Route 79 north of Bennettsville, South Carolina. The Preferred Alternative continues north, crossing the border into North Carolina, and has an interchange with N.C. Route 1803 prior to ending at an interchange at I-74 near Hamlet, North Carolina.

2.0 SECTION 4(f) RESOURCES

2.1 Historic Resources

One site, the Beauty Spot Motor Court Office Building (Resource 031 0011) near Bennettsville, South Carolina, was identified within or adjacent to the Preferred Alternative. This determination of eligibility was made after the publication of the Draft EIS. No other historic structures, parks, recreational facilities, or wildlife refuges were found within or adjacent to the Preferred Alternative.

Beauty Spot Motor Court Office Building

2.1.1 Description

Beauty Spot Motor Court Office Building (Resource 031 0011) was determined eligible for the NRHP by the SCSHPO under Criterion A for its role in and contribution to automobile or highway-related tourism in the United States and under Criterion C as an early and good example of what is often referred to as "roadside architecture." This historic resource is located at 690 U.S. Route 15/401, east of Bennettsville, South Carolina, and is a Tudor-style motor court office constructed circa 1920 (refer to Figure 1). The five-part building is covered with weatherboard and has a cross-gable roof. The building has undergone alterations and an addition was added to the rear recently. The cabins associated with the motor court no longer exist.

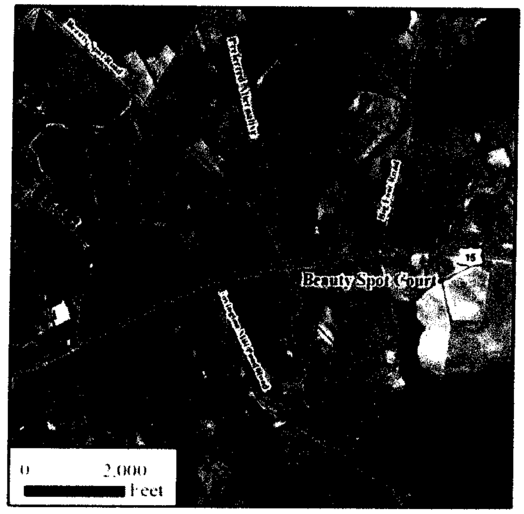


Figure 1: Location of Beauty Spot Motor Court Office Building

2.1.2 Impact

The Preferred Alternative would directly impact the Beauty Spot Motor Court Office Building with a proposed interchange of I-73 and U.S. Route 15/401 at this location, requiring the total acquisition of this property and the demolition of the structure (refer to Figure 1).

3.0 ALTERNATIVES AND FINDINGS

3.1 Development of Alternatives at U.S. Route 15/401

U.S. Route 15/401 is a primary roadway route that runs east-west through Marlboro County, South Carolina. All alternatives developed for I-73 must cross U.S. Route 15/401 and an interchange with this route would be beneficial to surrounding areas.

In coordination with federal and state regulatory and resource agencies, the Corridor Analysis Tool (CAT) was used to develop corridors that took into consideration various factors including environmental (natural and man-made) (refer to Chapter 2, Section 2.4, page 2-4). The corridors were composed of 122 segments that could be combined in various combinations to form 1,896 preliminary alternatives.

The segments developed by the CAT were further reduced according to those that had high impacts among several categories, including impacts to wetland acreage and value. The elimination of several endpoints with I-74 in North Carolina further reduced the number of possible segments, and resulted in six Preliminary Build Alternatives that fell within three corridors through the project study area (refer to Chapter 2, Section 2.5, page 2-14).

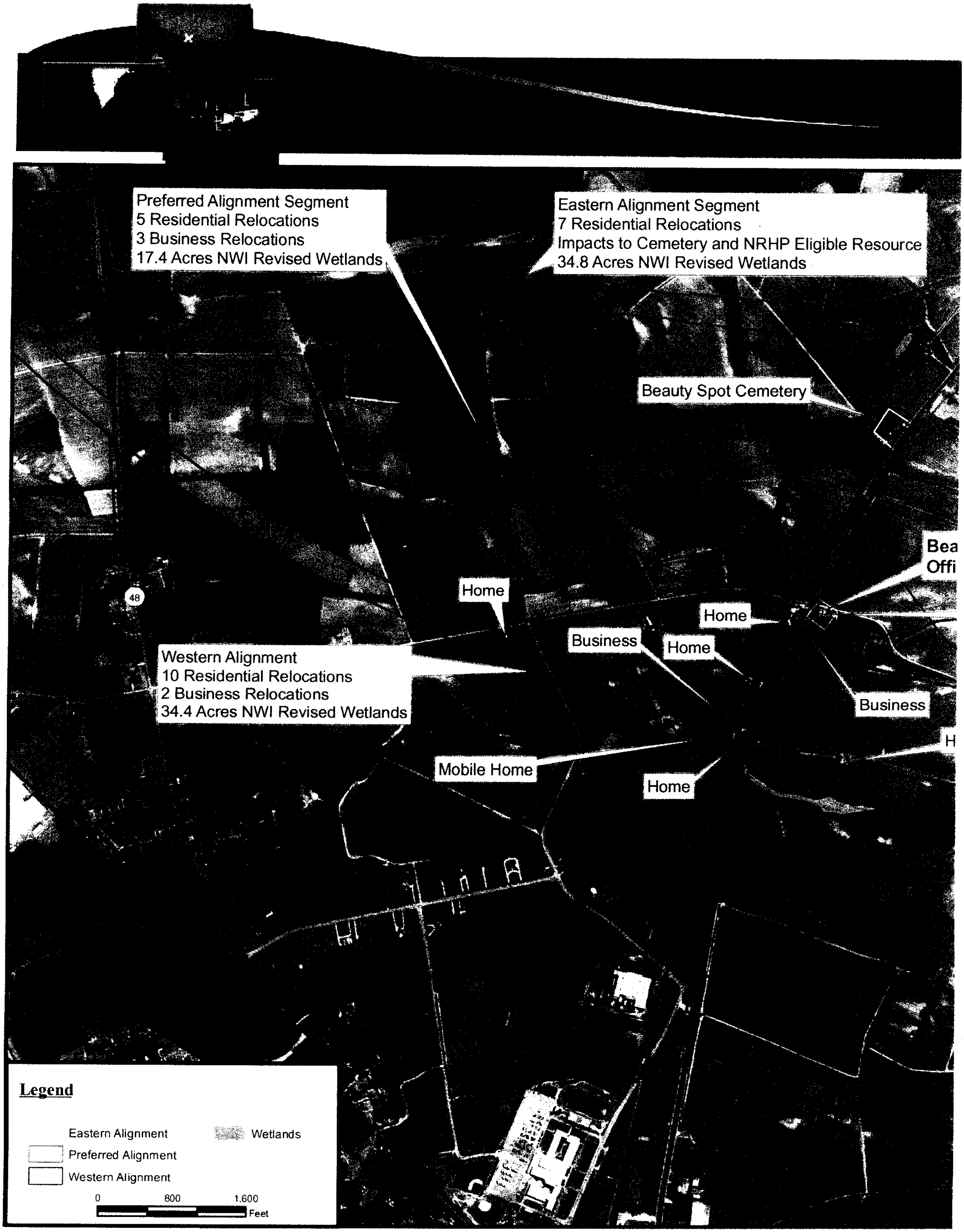
Additional categories were used to further evaluate the six alternatives, including infrastructure and cost per alternative. After extensive consultation with the federal and state regulatory and resource agencies, three Reasonable Build Alternatives were carried forward to the Draft Environmental Impact Statement (DEIS), based upon potential impacts.

3.2 Measures to Avoid and Minimize Impacts of the Preferred Alternative at the U.S. Route 15/401 Interchange

In an effort to avoid impacting the Beauty Spot Motor Court Office Building, two additional alignment segments of the Preferred Alternative at the U.S. Route 15/401 interchange area were developed and analyzed for impacts (refer to Figure 2, page E-6). For a comparable analysis, alignment segments were evaluated for impacts between S.C. Route 9 and Academy Road (Road S-35-17).

An eastern alignment segment was developed for possible avoidance of impacts to the Beauty Spot Motor Court Office Building. Beginning at S.C. Route 9, the eastern alignment segment would arc east, nearly paralleling Covington Road (Road S-35-349), crossing Spears Church Road and skirting Covington Millpond to the east. It would cross Cottingham Creek and then traverse slightly westward towards U.S. Route 15/401. At U.S. Route 15/401, the distance from the centerline of the original alignment segment to the eastern alignment segment centerline would be 3,450 feet. After the interchange at U.S. Route 15/401, the eastern alignment segment would continue arcing westward until it rejoined the original alignment at East Main Street (Road S-35-48) and following the original alignment until it reached Academy Road (Road S-35-17).

A western alignment segment was developed beginning at S.C. Route 9 and following the original alignment segment until its crossing at Cottingham Creek. It then turns slightly west towards the Bennettsville city limits, paralleling a tributary to Cottingham Creek until it reaches U.S. Route 15/401. The distance from the centerline of the interchange with U.S. Route 15/401 of the original alignment to the interchange centerline of this segment is 1,650 feet. Once past U.S. Route 15/401, the western alignment segment begins turning towards the east, crossing Beauty Spot Road (S-35-47) and East Main Street (S-35-48), before rejoining the Preferred Alternative at Academy Road (Road S-35-17). This alignment segment has the same interchange configuration as the original alignment, and would avoid the Beauty Spot Motor Court Office Building.


Preferred Alignment Segment
5 Residential Relocations
3 Business Relocations
17.4 Acres NWI Revised Wetlands
Eastern Alignment Segment
7 Residential Relocations
Impacts to Cemetery and NRHP Eligible Resource
34.8 Acres NWI Revised Wetlands
Beauty Spot Cemetery
48
Home
Home
Business
Home
Business
Western Alignment
10 Residential Relocations
2 Business Relocations
34.4 Acres NWI Revised Wetlands
Mobile Home
Home
Legend
Eastern Alignment
Wetlands
Preferred Alignment
Western Alignment
0
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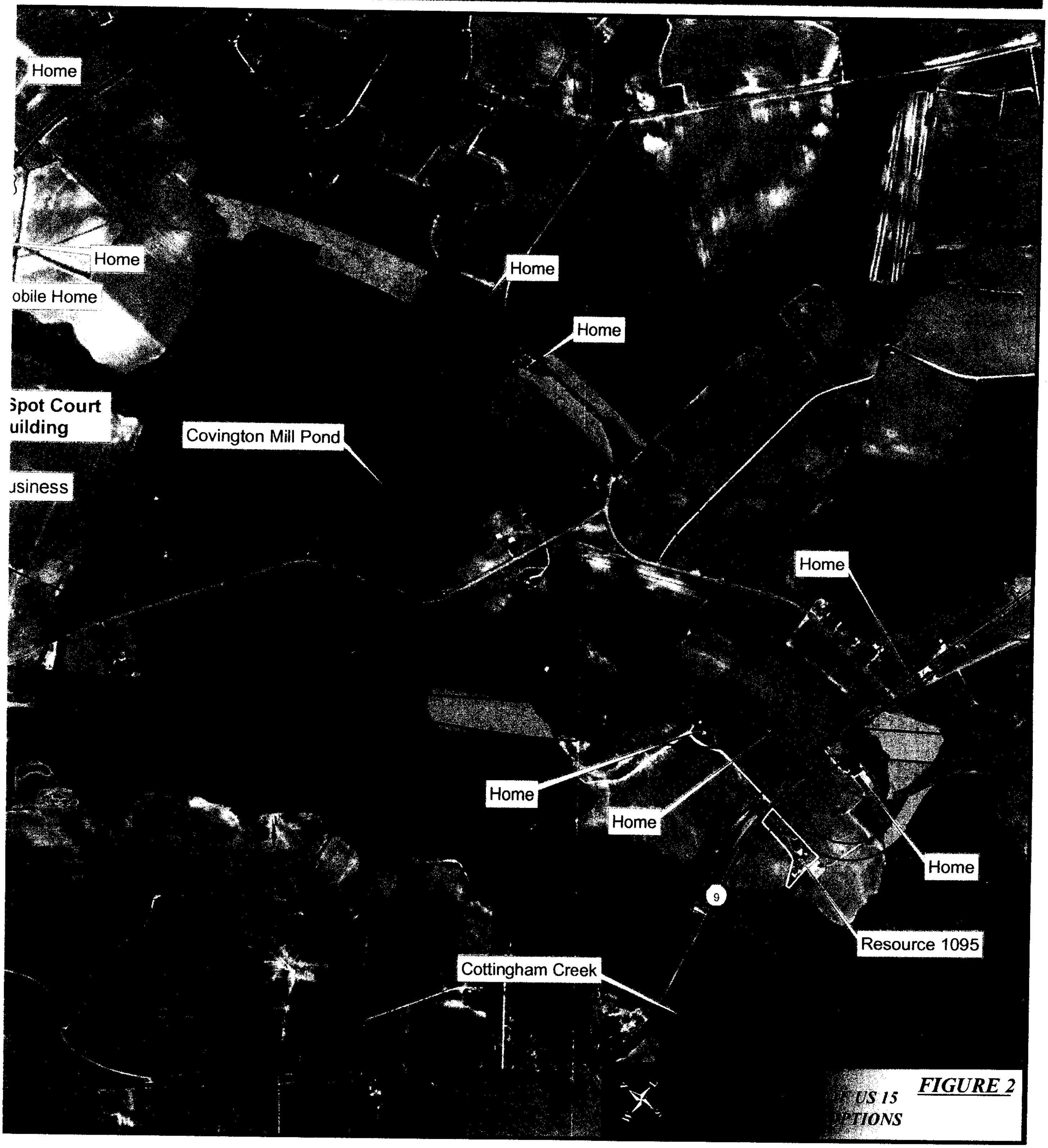

FIGURE 2

US 15
PTIONS

3.3 Mitigation

A mitigation plan was developed in coordination with the SCSHPO to include preparing a publication for public distribution, such as a brochure or poster that focuses on the history of the Beauty Spot Motor Court Office and provides a brief history of motor court and early automobile-related tourism in Marlboro County, South Carolina (refer to Attachment B of the ROD).

3.4 Comparison of the Alignment Segments at US Route 15/401

Figure 2 (refer to page E-6) and Table 1 present the differences in impacts of the three alignments, specifically concerning relocations and acres of wetlands impacts. The original alignment segment from Covington Millpond Road (Road S-35-356) to East Main Street (Road S-35-48) has five residential relocations and three business relocations and impacts 17.4 acres of wetlands. The eastern alignment segment increases to seven residential relocations, no business relocations, impacts the Beauty Spot Cemetery and Resource 1095, which is eligible for the NRHP, and doubles the amount of wetlands impacted to 34.8 acres. The western alignment segment doubles the residential relocations to ten with two business relocations, and also doubles the amount of wetlands impacted to 34.4 acres.

This comparison of the original alignment segment with the alternative segments shows that the original alignment segment is more prudent and feasible than the western or eastern alternative segments.

Table 1
Comparison of Preferred Alternative Alignment Segments

	Original Segment	Eastern Alignment	Western Alignment
Residential relocations	5	7	10
Business relocations	3	0	2
Wetland impacts (in acres)	17.4 acres	34.8 acres	34.4 acres
Other impacts	Impacts Beauty Spot Motor Court Office Building	Impacts Beauty Spot Cemetery and Eligible Archaeological Resource 1095	No impacts

3.4 Comparison of the Preferred Alternative to Other Reasonable Build Alternatives Considered

A discussion of the No-build Alternative and Reasonable Build Alternatives is found in the *Record of Decision for the Interstate 73 Final Environmental Impact Statement: from I-95 to Future Interstate 74 in North Carolina.* The impacts uses for comparison between the Reasonable Build Alternatives is based upon the findings for each Build Alternative contained in the DEIS.

3.4.1 No-build Alternative

The No-build Alternative would avoid some of the impacts such as changes to land use, impacts to wetlands, and noise impacts anticipated from the Reasonable Build Alternatives. However, the No-build Alternative would not provide the interstate link between I-95 and the North Carolina I-73/I-74 Corridor. Failure to provide this link would lead to the loss of projected economic opportunities, the potential loss of tourism, longer travel times, and the loss of the multimodal opportunities provided by the corridor. This alternative does not meet the purpose and need of the project.

3.4.2 Alternative 1

Alternative 1 would have the highest cost, $1.21 billion, which is over $130 million more than the Preferred Alternative. It would also have the most relocations (71), 30 more than the Preferred Alternative and the greatest amount of total farmland, 1,705 acres, impacted which is 200 acres more than the Preferred Alternative. Additionally, at 167.7 acres, it would have 50 acres more wetlands impacted than the Preferred Alternative.

The U.S. Fish and Wildlife Service and the South Carolina Department of Natural Resources (SCDNR) expressed concern that Alternative 1 would have the potential for more habitat fragmentation than the other Reasonable Build Alternatives as it crosses several major stream/wetland systems such as Little Reedy Creek, Three Creeks, Muddy Creek, Crooked Creek, and Herndon Branch.

The SCSHPO stated that this alternative would have the potential for negative visual impacts to a historic resource located on S-35-18.

Alternative 1 would not be a prudent alternative to the Preferred Alternative since it would cost substantially more, have more relocations, and impact 12 percent more farmlands and 30 percent more wetlands.

3.4.3 Alternative 3

Alternative 3 would directly impact a Section 4(f) resource, the McLaurin House, which is listed on the NRHP. It also has a high cost of $1.19 billion, over $100 million more than the Preferred Alternative. Alternative 3 impacts 156 acres more farmland at 1,582 acres and impacts 10,062 linear feet of streams, 1,919 linear feet more than the Preferred Alternative. Additionally, a church, poultry farm, and community store would be relocated by Alternative 3.

The South Carolina Department of Commerce expressed concern that Alternative 3 was too far removed from existing infrastructure, limiting potential future economic development. SCDNR expressed concern over the impact to Reedy Creek, a perennial stream in the project study area. The United States Department of Agriculture – Natural Resources Conservation Service expressed concern over an impact to a poultry operation, while the SCSHPO was concerned over the direct impact to a historic resource.

Alternative 3 would not be a prudent alternative to the Preferred Alternative since it would directly impact a Section 4(f) resource, have higher farmland (10 percent) and stream impacts (19 percent), and cost substantially more. Additionally, several federal and state agencies expressed concern over this alternative's potential economic and environmental impacts.

4.0 COORDINATION

The I-73 project has been developed in ongoing coordination with resource and regulatory agencies and officials having jurisdiction over Section 4(f) resources that may be affected. Archaeological and historical reports were coordinated with the SHPOs for both states for determinations of eligibility and effects. As the alternatives were developed, the South Carolina Agency Coordination Team, including representatives from SCSHPO (as part of the South Carolina Department of Archives and History), met regularly from October 2005 to the present. In addition, there were six meetings held with the North Carolina Interagency group to solicit comments on the alternatives and potential impacts from the project. Changes to the project were frequently made as a result of the agency interaction.

SCDOT conducted a cultural resource survey for the proposed widening of U.S. Route 15/401 in 1996. The Beauty Spot Motor Court Office Building was identified as potentially eligible during this 1996 survey. The site was reassessed during the cultural resource survey of the project study area for the proposed I-73 Corridor, and was recommended not eligible for the NRHP based on a lack of integrity. On August 30, 2007, the SCSHPO Eligibility Committee reviewed this resource and decided it was eligible for the NRHP since it still conveyed the feeling of a motor court and was an early example of this resource type in Marlboro County, South Carolina.

Representatives of the SCSHPO and the I-73 Project Team reviewed the resource in the field on November 2, 2007. Information gathered was presented to the SCSHPO Eligibility Committee on November 8, 2007, and they reconfirmed their eligibility determination. On February 21, 2008, representatives from FHWA, SCDOT, SCSHPO, and the I-73 Project Team met to discuss mitigation for this resource. FHWA presented its concerns regarding the SCSHPO's decision on the eligibility of the resource. SCSHPO and FHWA met informally March 4, 2008 concerning SCSHPO's eligibility decision and SCSHPO reaffirmed their decision at that time.

The FHWA and SCODT accepted the SCSHPO's decision of eligibility and proceeded with the Section 4(f) Evaluation and the Section 106 mitigation. A meeting to discuss mitigation for the Beauty Spot Motor Court Office Building was held with SCSHPO, SCDOT, and the I-73 Project Team on May 2, 2008. A Memorandum of Agreement was signed in July, 2008 (refer to Attachment B of the ROD).

The Draft Section 4(f) Evaluation was included as Appendix E of the *Interstate 73 Final Environmental Impact Statement: from I-95 to Future Interstate 74 in North Carolina.* This document was distributed to the U.S. Department of Interior on August 11, 2008 and the SCSHPO Office on August 8, 2008 for review and comment. In addition, other state and federal agencies, state and local officials, non-governmental organizations received copies of document for review and comment. Copies of the document were also placed at the local libraries in the project study area and county administrators' offices for the public to view and comment. A copy of the document is also available electronically at the project website, http://www.I73inSC.com for everyone to access.

Thus far, no comments have been received on the Draft Section 4(f) Evaluation; however, the comment period ends on September 29, 2008. No changes of have been made to the alignment of the Selected Alternative since the release of the Draft Section 4(f) Evaluation.

5.0 CONCLUSION

The Preferred Alternative (Alternative 2) was selected in the DEIS based upon less severe impacts to the environment including the least amount of wetland impacts (114.3 acres) and impacts to farmland (1,505 acres), the lowest cost ($1.08 billion), fewest relocations, is centrally located to serve more communities equally in regards to economic development with greater access to existing infrastructure, and is supported by agencies, local governments, and the public. Because of modifications made in response to public comments and the results of detailed field surveys, the impacts have changed since the publication of the DEIS. The wetland impacts are now 57.2 acres, farmland impacts are now 1,578 acres, the cost is now $1.125 billion (which includes a new additional interchange in North Carolina and other new design features such as more overpasses), and the relocations have been decreased to a total of 28 .

Based upon the above considerations, there is no feasible and prudent alternative to the use of the Beauty Spot Motor Court Office Building, and the proposed action includes all possible planning to minimize harm to the Beauty Spot Motor Court Office Building resulting from such use.

MEMORANDUM OF AGREEMENT BETWEEN THE FEDERAL HIGHWAY ADMINISTRATION, THE SOUTH CAROLINA DEPARTMENT OF TRANSPORTATION, AND THE SOUTH CAROLINA STATE HISTORIC PRESERVATION OFFICE

Whereas, the Federal Highway Administration (FHWA) has determined that the Interstate 73 Project in Marlboro County, South Carolina, will have an adverse effect upon the Beauty Spot Motor Court Office (Survey Site # 0011), a property determined eligible for inclusion in the National Register of Historic Places, and

WHEREAS, the FHWA has notified the Advisory Council on Historic Preservation of the adverse effect determination in accordance with Section 106 of the National Historic Preservation Act (36 CFR Part 800.6 (a)) and the Council has elected not to participate, and

WHEREAS, the FHWA has delegated responsibility to the South Carolina Department of Transportation (SCDOT) to coordinate with the South Carolina State Historic Preservation Officer (SHPO) on matters related to Section 106 of the National Historic Preservation Act (16 U.S.C. Sec. 470f), and

WHEREAS, the SCDOT has consulted with the South Carolina SHPO in accordance with Section 106 of the National Historic Preservation Act (16 U.S.C. Sec. 470f) and its implementing regulations (36 CFR Part 800) to resolve adverse effects, and

NOW, THEREFORE, the FHWA, the SCDOT, and the South Carolina SHPO agree that the undertaking will be implemented according to the following stipulations in order to take into account the effects of the undertaking on the Beauty Spot Motor Court Office:

STIPULATIONS

The FHWA and the SCDOT will ensure that the following stipulation is implemented:

1.) A "popular" publication, such as a brochure or poster, focusing on the history of the Beauty Spot Motor Court Office and providing a brief context of motor court and early automobile-related tourism history in Marlboro County will be produced. The term "popular" is used because the publication should include images, graphics, and language designed to appeal to the general public. The publication may cover areas and resources beyond Marlboro County if those are pertinent to the history and context. Two Thousand (2,000) copies of this publication will be produced and copies will be distributed to the Marlboro County Historical Society, the Marlboro County Historic Preservation Commission, the Marlboro County Public Library, and the Pee Dee Council of Governments. The remaining copies will be submitted to the SHPO. Additionally, an electronic copy in PDF format will be submitted to the South Carolina SHPO for posting on the South Carolina SHPO's website.

Late Discoveries

If unanticipated cultural materials (e.g., large, intact artifacts or animal bones; large soils stains or patterns of soil stains; buried brick or stone structures; clusters of brick or stone) or human skeletal remains are discovered during construction activities, then the Resident Construction Engineer shall be immediately notified and all work in the vicinity of the discovered materials shall cease until an evaluation can be made by the SCDOT archaeologist in consultation with the South Carolina SHPO.

Dispute Resolution

The FHWA, the SCDOT, and the South Carolina SHPO will attempt to resolve any disagreement arising from the implementation of the MOA. This will include any disputes that arise concerning the contents of the report(s), including but not limited to its merit as a cultural resource management document.

In the event that the terms of this agreement cannot be carried out, the FHWA and SCDOT will submit a new (or amended) MOA to the South Carolina SHPO and the Council for review. If consultation to prepare a new MOA or amendments proves unproductive, the FHWA will seek Council comment in accordance with 36CFR Part 800.6(b)(1).

Amendment and Modification

Any party to this MOA may request that it be amended or modified at any time, whereupon the parties will consult with each other to consider such amendment or modification.

Execution of this Memorandum of Agreement by the Federal Highway Administration, the South Carolina Department of Transportation, and the South Carolina State Historic Preservation Office and implementation of its terms, is evidence that the FHWA has taken into account the effects of the undertaking on the Beauty Spot Motor Court Office in accordance with Section 106 of the National Historic Preservation Act (16 U.S.C. Sec. 470f) and its implementing regulations (36 CFR Part 800).

Federal Highway Administration

By: Patrick L. Tyndall Date: 7-17-08

South Carolina Department of Transportation

By: Wayne D. Roberts Date: 7/14/08

South Carolina State Historic Preservation Office

By: Rodger E. Stroup Date: 5/15/08

MEMORANDUM OF AGREEMENT

BETWEEN THE FEDERAL HIGHWAY ADMINISTRATON, THE SOUTH CAROLINA DEPARTMENT OF TRANSPORTATION AND THE SOUTH CAROLINA HISTORIC PRESERVATION OFFICER REGARDING THE INTERSTATE 73 PROJECT IN MARLBORO AND DILLON COUNTIES, SOUTH CAROLINA

WHEREAS the Federal Highway Administration (FHWA) and the South Carolina Department of Transportation (SCDOT) plan to approve the I 73 project (undertaking) pursuant to Section 106 of the National Historic Preservation Act (16 U.S.C. Sec. 470f); and

WHEREAS the undertaking consists of construction of an interstate highway along new alignment beginning at the North Carolina border in Marlboro County and ending near Centerville Road just north of I-95 in Dillon County; and

WHEREAS, FHWA and SCDOT have defined the undertaking's area of potential effect (APE) as a corridor with a maximum width of 400 feet that is within a 600 foot wide archaeological survey universe and extending the length of the undertaking; and

WHEREAS the FHWA has delegated responsibility to the SCDOT to coordinate with the South Carolina State Historic Preservation Officer (SHPO) on matters related to Section 106 of the National Historic Preservation Act (16 U.S.C. Sec. 470f). and

WHEREAS the FHWA and SCDOT agree that the undertaking may have an adverse effect on archaeological sites 38ML291, 38ML296, 38ML309, and 38ML340, which are potentially eligible for listing in the National Register of Historic Places (NRHP), and have consulted with the South Carolina Historic Preservation Officer (SHPO) pursuant to 36 C.F.R. part 800, of the regulations implementing Section 106 of the National Historic Preservation Act (16 U.S.C. § 470f). Three additional sites (38DN165, 38ML297, and 38ML342) require additional work before their NRHP eligibility can be assessed; and

WHEREAS in accordance with 36 C.F.R. § 800.6(a)(1), FHWA has notified the Advisory Council on Historic Preservation (ACHP) of its potential adverse effect determination with specified documentation and the ACHP has chosen not to participate in the consultation pursuant to 36 CFR § 800.6(a)(1)(iii); and

NOW, THEREFORE, FHWA, SCDOT, and the SHPO agree that the undertaking shall be implemented in accordance with the following stipulations in order to take into account the effect of the undertaking on historic properties.

STIPULATIONS

The FHWA and SCDOT shall ensure that the following measures are carried out:

1. SHPO's August 15, 2008 Comments on the draft archaeological survey report will be addressed and a final report produced according to the SHPO's established guidelines.

2. The final design of the project will attempt to avoid and/or minimize adverse effects to historic properties, where possible.

3. Upon right-of-way acquisition or signed right-of-entry permission, the SCDOT's archaeological consultant, or staff, will perform test excavations at sites that are within the APE to make a final determination of National Register eligibility. The results of test excavations and the SCDOT's recommendation of National Register eligibility will be summarized in a technical report and submitted to the South Carolina SHPO for review. Sites determined not eligible in consultation with the SHPO will no longer be historic properties.

4. If there are adverse effects to historic properties that cannot be avoided (i. e. "preserved in place"), the affected historic properties will undergo data recovery in consultation with the SHPO and Catawba Indian Nation Tribal Historic Preservation Officer (THPO).

5. SCDOT's archaeological consultant, or staff, will develop a treatment plan for data recovery investigations. The treatment plan will include a description of the project's research design and sampling strategy. The treatment plan will be submitted to the South Carolina SHPO and THPO for review and approval prior to any fieldwork. The South Carolina SHPO and THPO will be afforded thirty (30) days to review the treatment plan(s) and provide comments.

6. All plans and reports developed for the treatment of sites subjected to data recovery shall incorporate guidance from the Secretary of the Interior's "Standards and Guidelines for Archaeological Documentation" (48 FR 44734-37) and the President's Advisory Council on Historic Preservation publication, Treatment of Archaeological Properties (ACHP 1980). In addition, these materials will be consistent with South Carolina Standards and Guidelines for Archaeological Investigations (2005).

7. At least one on-site meeting between the SCDOT, the South Carolina SHPO, and the THPO will take place during field investigations in order to discuss any necessary revisions to the original scope of work. Any revisions made to the original scope of work will be attached to the approved treatment plan and this agreement

8. A minimum of two copies of the draft technical report of data recovery investigations will be submitted to the South Carolina SHPO and THPO for review and approval within twelve (12) months from the last day of fieldwork. The draft technical report will be consistent with the standards outlined in South Carolina Standards and Guidelines for

Archaeological Investigations (2005). The South Carolina SHPO and THPO reserve the right to submit the draft technical report to qualified professional archaeologists for the purpose of peer review

9. Within three (3) months of draft report approval, SCDOT shall provide one bound copy and one compact disk containing a Portable Document Format (PDF) of the final technical report for the SHPO and THPO, and two bound copies, one unbound copy, and one PDF copy of the final technical report for the South Carolina Institute of Archaeology and Anthropology, all submitted to SHPO. The PDF file will be developed according the specifications and requirements of the SHPO. A separate digital abstract from the report (in Word or html format) will also be provided to the SHPO and THPO. The abstract file can be provided on the same CD as the PDF file.

10. The SCDOT will ensure that all artifacts recovered during archaeological investigations are stabilized and processed for curation at the South Carolina Institute of Archaeology and Anthropology. Copies of all records, including but not limited to field notes, maps, catalogue sheets, and representative photographs and negatives will be submitted for curation with the artifacts

11. The SCDOT, the South Carolina SHPO, and THPO will consult to determine the appropriate format for a public education component. A public education plan will be submitted with the draft technical report and all public education materials will be developed within two (2) years from the last day of fieldwork.

IV. DURATION

This MOA will be null and void if its terms are not carried out within five (5) years from the date of its execution. Prior to such time, FHWA and SCDOT may consult with the other signatories to reconsider the terms of the MOA and amend it in accordance with Stipulation VIII below.

V. POST-REVIEW DISCOVERIES

If potential late discoveries or unanticipated effects on historic properties are found, the FHWA and the SCDOT shall implement standard late discovery procedures with appropriate consultation with the SHPO and ACHP.

VI. MONITORING AND REPORTING

Each year following the execution of this MOA until it expires or is terminated, FHWA and the SCDOT shall provide all parties to this MOA a summary report detailing work undertaken pursuant to its terms. Such report shall include any scheduling changes proposed, any problems encountered, and any disputes and objections received in FHWA's and the SCDOT's efforts to carry out the terms of this MOA.

VII. DISPUTE RESOLUTION

Should any signatory to this MOA object at any time to any actions proposed or the manner in which the terms of this MOA are implemented, FHWA and SCDOT shall consult with such party to resolve the objection. If FHWA and SCDOT determine that such objection cannot be resolved, the FHWA and SCDOT will:

A. Forward all documentation relevant to the dispute, including the FHWA and SCDOT's proposed resolution, to the ACHP. The ACHP shall provide FHWA and SCDOT with its advice on the resolution of the objection within thirty (30) days of receiving adequate documentation. Prior to reaching a final decision on the dispute, FHWA shall prepare a written response that takes into account any timely advice or comments regarding the dispute from the ACHP, signatories and concurring parties, and provide them with a copy of this written response. FHWA and SCDOT will then proceed according to its final decision.

B. If the ACHP does not provide its advice regarding the dispute within the thirty (30) day time period, FHWA and SCDOT may make a final decision on the dispute and proceed accordingly. Prior to reaching such a final decision, FHWA and SCDOT shall prepare a written response that takes into account any timely comments regarding the dispute from the signatories and concurring parties to the MOA, and provide them and the ACHP with a copy of such written response.

C. FHWA and SCDOT's responsibility to carry out all other actions subject to the terms of this MOA that are not the subject of the dispute remain unchanged.

VIII. AMENDMENTS

This MOA may be amended when such an amendment is agreed to in writing by all signatories. The amendment will be effective on the date a copy signed by all of the signatories is filed with the ACHP.

IX. TERMINATION

If any signatory to this MOA determines that its terms will not or cannot be carried out, that party shall immediately consult with the other parties to attempt to develop an amendment per Stipulation VIII, above. If within thirty (30) days (or another time period agreed to by all signatories) an amendment cannot be reached, any signatory may terminate the MOA upon written notification to the other signatories.

Once the MOA is terminated, and prior to work continuing on the undertaking, FHWA and SCDOT must either (a) execute an MOA pursuant to 36 CFR § 800.6 or (b) request, take into account, and respond to the comments of the ACHP under 36 CFR § 800.7. FHWA and SCDOT shall notify the signatories as to the course of action it will pursue

Execution of this MOA by the FHWA, SCDOT, and SHPO and implementation of its terms evidence that FHWA and SCDOT have taken into account the effects of this undertaking on historic properties and afforded the ACHP an opportunity to comment.

SIGNATORIES:

Federal Highway Administration

Patrick Tyndall Date 9 23 08
Patrick Tyndall

South Carolina Department of Transportation

Wayne D. Roberts Date 9/17/08
Wayne D. Roberts

South Carolina Historic Preservation Office

Elizabeth M. Johnson ~~Date~~ 9/19/08
Elizabeth Johnson

Attachment D

United States Department of the Interior

FISH AND WILDLIFE SERVICE
176 Croghan Spur Road, Suite 200
Charleston, South Carolina 29407

August 6, 2008

Ms. Amanda Brooks Queen
Environmental Projects Manager
South Carolina Department of Transportation
Post Office Box 191
Columbia, SC 29202-0191

Re: I-73 Northern Phase, Biological Assessment

Dear Ms. Queen.

The U. S. Fish and Wildlife Service (Service) has received the results of the Biological Assessment (BA) for the proposed construction of the northern phase of I-73 between I-95 in Dillon County and I-74 near Hamlet, North Carolina. The BA, completed by the South Carolina Department of Transportation (SCDOT), provides a brief description of the project and its proposed corridor, a review of habitats within the corridor and a list of the nine protected species known to occur within Dillon and Marlboro Counties, SC as well as Richmond and Scotland Counties, NC.

The Service recommends SCDOT contact the National Marine Fisheries Service (NMFS) for consultation requirements regarding the shortnose sturgeon, *Acipenser brevirostrum*. The bald eagle, *Haliaeetus leucocephalus*, was delisted in August 2007 and no longer protected under the Endangered Species Act, 1973; therefore no section 7 consultation is required.

The BA concluded that the proposed activity will have no effect on any of the species reviewed. Upon view of the information provided, the Service concurs with conclusions in the BA regarding listed species. However, obligations under section 7 of the Endangered Species Act must be considered if (1) new information reveals impacts of this identified action that may affect any listed species or critical habitat in a manner not previously considered, (2) this action is subsequently modified in a manner which was not considered in this assessment, or (3) a new species is listed or critical habitat is determined that may be affected by the identified action.

Attachment D

If you have any questions regarding the Service's comments, please do not hesitate to contact Mark Caldwell at

Sincerely,

Timothy N. Hall
Field Supervisor

TNH/MAC

cc: Mr. Patrick Tyndall, FHWA, Columbia, SC

I-73 Compensatory Mitigation Plan

Dillon, Horry, Marion and Marlboro Counties, SC

Gunter's Island Tract

SAC 2008-1333-DIS

SUBMITTED TO:
U.S. Army Corps of Engineers, Charleston District
U.S. Environmental Protection Agency, Region 4
U.S. Fish and Wildlife Service, Charleston Ecological Services
National Oceanic and Atmospheric Administration, National Marine Fisheries Service
U.S. Department of Agriculture, Natural Resource Conservation Service
S.C. Department of Natural Resources
S.C. Department of Health and Environmental Control

Prepared by:

SCDOT
South Carolina Department of Transportation

June 20, 2016

SCDOT

Executive Summary

I-73 Compensatory Mitigation Plan

Over the past ten years, the South Carolina Department of Transportation (SCDOT) has been diligent in their efforts to develop a new major interstate project, which considers both the human and natural environment. To the maximum extent practicable, avoidance and minimization has been incorporated into the development of the project. Through evaluation, coordination, and collaboration with its State and federal partner agencies, SCDOT is now able to present a mitigation plan, which fully compensates for the necessary adverse impacts resulting from the construction of Interstate 73.

In an effort to propose the best option available, SCDOT evaluated many different options for mitigation for this large scale highway project and its impacts. As such, the large scale watershed approach to mitigation was determined to be the most reasonable, feasible, and economical method to ensure the project continues to construction authorization while still considering its impacts to the region.

On December 3, 2015 the SCDOT Commission unanimously approved the purchase and use of Gunter's Island for mitigation of the environmental impacts associated with the construction of I-73.

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Appendices

1.0 Introduction

South Carolina Department of Transportation (SCDOT), in association with the Federal Highway Administration (FHWA), proposes to construct Interstate 73 (I-73) on new alignment in eastern South Carolina. The I-73 corridor runs through four counties (Dillon, Horry, Marion and Marlboro) in the northeastern section of South Carolina (Figures 1). The corridor runs for approximately 75 mile from the border with North Carolina just north of Bennettsville in Marlboro county (33.792260, -79.0660296), south of the town of Dillon and north of the town of Marion to intersect with SC 22 just north of the City of Conway in Horry County (33.940903, -79.062486). The project is located within three Pee Dee drainage sub-basins: the Pee Dee, Little Pee Dee, and Waccamaw (Hydrologic Unit Codes (HUC) 03040201, 03040204, and 03040206, respectively) (Figure 2) within both the EPA Level III Ecoregions Southeastern Plains and Middle Atlantic Coastal Plains (Figure 3).

The potential effects of the project were documented in two Environmental Impact Statements (EISs), one covering the area from Hamlet, North Carolina to I-95, and the other from I-95 to U.S. 17. The documents were prepared in collaboration with cooperating state and federal agencies including the National Oceanic and Atmospheric Administration (NOAA), South Carolina Department of Natural Resources (SCDNR), Natural Resources Conservation Service (NRCS), S.C. Department of Archives and History (SCDAH), S.C. Department of Health and Environmental Control (SCDHEC), S.C. Department of Commerce (SCDOC), S.C. Department of Parks, Recreation and Tourism (SCPRT), United States Army Corps of Engineers (USACE), U.S. Fish and Wildlife Service (USFWS), and U.S. Environmental Protection Agency (USEPA). This working group is referred to as the Agency Coordination Team (ACT). Although two EIS documents were prepared for the project, it was decided that a single Section 404 permit would be sought for the entire length of I-73 in South Carolina. A detailed project description for the I-73 project, including all proposed alternatives, can be found in the Final Environmental Impact Statement (FEIS) located on the SCDOT website (www.i73insc.com).

As prescribed in Section 404(b)(1) Guidelines of the Clean Water Act (40 CFR 230), SCDOT provided details regarding avoidance and minimization measures to limit direct impacts, including evaluation of alternatives, in Chapter 2 of the FEISs and in the Section 404 permit application (SAC 2008-1333-DIS). Avoidance and minimization measures incorporated into the design include the use of 2:1 fill slopes where practicable to reduce the impact footprint, the use of bridges rather than box culverts at some higher quality wetlands and streams, and a commitment to using best management practices (BMPs) during construction to avoid non-permitted impacts to adjacent wetlands and streams. However, direct impacts to waters of the United States, approximately 4,643 linear feet of stream and 342.3 acres of wetlands, are still proposed after full incorporation of avoidance and minimization measures. Details on the unavoidable direct impacts proposed with this application are provided in Chapter 3 of the FEISs.

2.0 Available Mitigation Credits

The I-73 project site is located within three watersheds; however, the Waccamaw River watershed (03040206) is the only one with mitigation banks, the Waccamaw, Vandross Bay and Carter Stilley banks. None of the banks contain enough credits to cover the proposed impacts and could only be used for those impacts within the Waccamaw watershed. Therefore, prior to and during the permitting/EIS process, SCDOT considered watershed needs and decided to develop a Permittee Responsible Mitigation Plan. The Middle Pee-Dee, Little Pee-Dee and Waccamaw watersheds were evaluated by SCDOT in conjunction with the resource and regulatory agencies for mitigation opportunities that could provide environmental benefits on a watershed and regional scale appropriate for the I-73 project.

3.0 Watershed Approach

In consultation with SCDNR, SCDOT identified the acquisition of the 6,134 acre Gunter's Island Tract to offset in excess the impacts to waters of the United States by preserving fourteen times greater the amount of stream and wetlands to be impacted, with the preservation of 89,836 linear feet of stream and 4583.1 acres of wetlands (Figures 4-6). The selection of the Gunter's Island tract is a large-scale mitigation opportunity with regional importance based on a watershed approach to protect water quality and aquatic resources in accordance with the 2008 Mitigation Rule (33 CFR Parts 325 and 332, 40 CFR Part 230). Gunter's Island is located in the Little Pee Dee watershed, and within the Middle Atlantic Coastal Plain Level III Ecoregion, where 74% of the wetland impacts will occur and 78% of the stream impacts for the proposed project (Figure 7).

3.1 Watershed Descriptions

3.1.1 Sub-basins

The impact site is located within the Pee Dee River basin (HUC 030402) and the Pee Dee, Little Pee Dee and Waccamaw sub-basins (Figure 2).

3.1.1.1 Pee Dee Sub-basin (8-Digit HUC 03040201)

The Pee Dee sub-basin extends from the North Carolina border southeast to Winyah Bay, encompassing approximately 2,350 square miles within 8 South Carolina counties, most of Chesterfield, Darlington, Florence and Marlboro Counties and approximately half of Georgetown and Williamsburg Counties. The sub-basin comprises 7.8% of South Carolina's land area. A majority of the watershed is rural with major population centers in Florence, Bennettsville, Darlington, Marion, Hartsville and Cheraw. Offstream water use totaled 355,129 million gallons, ranking it second among the 15 sub-basins in the state, with 97% from surface water and 3% from ground water. Thermoelectric power (Progress Energy's H.B. Robinson electrical generating station) accounts for 83% of water use within the watershed which is the second highest water use for thermoelectric power generation in nine of the State's fifteen sub-basins. The next greatest users of water in the sub-basin were industry at 10%, which is the highest overall industrial water use in the state, and water supply at 6%. All waterbodies within this sub-basin are classified as "Freshwater," except for Winyah Bay, by SCDHEC, meaning they are suitable for aquatic life, recreation, drinking water, fishing, industry and agriculture.

(8-Digit HUC 03040204)

This sub-basin is in the northeastern part of the Pee Dee region with the North Carolina state line as its eastern border. It encompasses part of four counties: Dillon, Marion, Horry and Marlboro covering 1,100 square miles and 3.5% of the State's land area. The majority of this sub-basin is rural with the major urban areas to the east in the Waccamaw sub-basin that includes both Conway on the Little Pee Dee sub-basin's eastern boundary and Bennettsville to the northwest. The major population centers within the sub-basin are Dillon and Mullins. Offstream water use totaled 2,487 million gallons, ranking it fourteenth among the 15 sub-basins in the state, with 98% from ground water and 2% from surface water. Water-supply use accounted for almost 95% of the total water use, followed by industry (3%), golf course use (2%) and irrigation (1%). Most of the water bodies within the Little Pee Dee sub-basin are designated as "Freshwater," however, a part of the Little Pee Dee River and Cedar Creek are designated by SCDHEC as "Outstanding Resource Waters," meaning that these freshwater streams provide outstanding recreational or ecological resources and are suitable for drinking water with minimal treatment. 74% of the wetland impacts and 78% of the stream impacts occur within the Little Pee Dee sub-basin.

Waccamaw Sub-basin (8-Digit HUC 03040206)

The Waccamaw sub-basin runs parallel to the coast on the easternmost part of the State and to the north of the basin along the North Carolina border for 30 miles including all of Winyah Bay and the City of Georgetown. Most of Horry County, including the infamous Grand Strand, and part of Georgetown are encompassed in the sub-basin. The sub-basin is about 995 square miles and 3.2% of the State's land area. This is a rapidly expanding area of the state with population projections to increase 30% from 2000 to 2020 in Horry County and Georgetown to increase 19%; this does not include the potential increase in the transient population throughout the tourist season. A majority of this sub-basin is urban with major population centers in Myrtle Beach, Conway and Georgetown. Offstream water use totaled 67,039 million gallons, ranking it eighth among the 15 sub-basins, with 97% from surface water and 3% from ground water. Thermoelectric power production (Santee Cooper's Grainger and Winyah electrical generating stations) accounts for 73%, followed by water supply (13%) and golf courses (7%), which account for more than 1/3 of the statewide golf course water use. Most of the waterbodies within the Waccamaw sub-basin are classified by SCDHEC as "Freshwater," with a few exceptions. Parts of Little River and the Atlantic Intracoastal Waterway and its tributaries (from the crossing of SC 9 to the North Carolina Line) are designated "Tidal Saltwater Class SA," meaning these areas are suitable for indigenous aquatic communities of marine life and average dissolved oxygen level should be at a minimum 5.0 mg/L (milligrams per liter), and no less than 4.0 mg/L. This water is not protected for harvesting clams, mussels or oysters for marketing purposes or human consumption. Winyah Bay and the Sampit River are "Tidal Saltwater Class SB," meaning the same as "Tidal Saltwater Class SA," except the dissolved oxygen averages should be above 4.0 mg/L.

Connectivity to Protected Lands and Corridors

The Gunter's Island site is within SCDNR's Little Pee Dee-Lumber Focus Area (Figure 8) that encompasses the Lumber and Little Pee Dee Rivers, from the North Carolina-South Carolina state line, southwest to U.S. Hwy 378. The focus area concept encourages conservation on a landscape-scale with the use of partnerships between federal and state land managers and private landowners through voluntary conservation easements. Together, these land protection actions preserve ecologically sensitive areas and enhance the existing outstanding, natural, cultural and recreational resources that surround the rivers within the focus area. A copy of the Little Pee Dee-Lumber Focus Area Plan in included in Appendix B.

The preservation of Gunter's Island (herein referred to as the Site) and the enhancements within provide an ideal opportunity to pursue landscape-scale, ecologically meaningful stream and wetland mitigation. The Site encompasses a large tract of contiguous acreage on the floodplain of the Little Pee Dee River and is a contributor to the Great Pee Dee River, located less than 10 miles south southeast of the Site. Fourteen miles of the lower Little Pee Dee River from Highway 378 to the confluence with the Great Pee Dee River were designated a State Scenic River in March of 1990 by the Legislature. Immediately upstream of Highway 378, an additional 64-mile section of the Little Pee Dee River was determined eligible for scenic river status in 1997 but was never officially designated. Further upstream, the Little Pee Dee in Dillon County (a 48-mile section) was designated a Scenic River in 2005. The Little Pee Dee River is designated as an Outstanding Water Resource (ORW) by SCDHEC, and an Aquatic Resource of National Importance (ARNI) by the USEPA.

Just to the south and across the Little Pee Dee River, the Site connects with the 25,924 acre Woodbury Wildlife Management Area. The southern end of the tract is adjacent to the 200 Johnson tract of the Little Pee Dee Heritage Preserve and the northern boundary of Gunter's Island lies approximately 3 miles south of the majority of the Little Pee Dee Heritage Preserve/Wildlife Management Area that protects 10,406.39 acres along the Little Pee Dee and its floodplain (Figure 9). The connectivity of these habitats to the Site will not only provide an opportunity for wildlife and plant communities to flourish, but will spur further conservation efforts up to 5,000 acres within the Little Pee Dee-Lumber Focus Area by state agencies, land protection organizations and private landowners.

Following the approval of the Permittee-Responsible Mitigation Plan, the Gunter's Island Tract will be transferred to the SCDNR Heritage Trust Program, upon approval by the Heritage Trust Advisory Board. The SCDNR will manage the property with traditional management practices similar to those utilized in both the Little Pee Dee Heritage Preserve and the Woodbury Wildlife Management Area.

3.3 Land Use and Potential for Growth

The Pee Dee and Little Pee Dee sub-basins are both in the Great Pee Dee River Basin and the Waccamaw sub-basin is in the Waccamaw River Basin. For the Great Pee Dee River Basin, the urban land percentage is comprised chiefly in the Cities of Florence, Darlington, Bennettsville and Dillon. The Waccamaw River Basin's urban land percentage is comprised chiefly in the Cities of Conway, Georgetown, Myrtle Beach and North Myrtle Beach. Table 1 below provides an overview of the Land Use for the three sub-basins for the proposed impacts according to the SCDHEC Watershed Assessment.

Table 1: Land Use

Land Use	**% Coverage within the Great Pee Dee River Basin**
Agricultural Land	33.4
Barren Land	0.2
Forested Land	25.7
Forested Wetland (Swamp)	27.9
Non-Forested Wetland (Marsh)	1.2
Scrub/shrub Land	2.7
Urban Land	6.3
Water	2.6
Total Acreage in Basin	**2.5 million**
Land Use	**% Coverage within the Waccamaw River Basin**
Agricultural Land	26.5
Barren Land	0.2
Forested Land	19.2
Forested Wetland (Swamp)	36.9
Non-Forested Wetland (Marsh)	2.2
Scrub/shrub Land	2.8
Urban Land	10.5
Water	1.7
Total Acreage in Basin	**500,000**

According to the Second Edition of the SC State Water Assessment, prepared by SCDNR, the table below provides the expected population increases for each of the sub-basins: the Pee Dee, Little Pee Dee and the Waccamaw. Within the Pee Dee sub-basin, the counties expected to exhibit the largest population increases from 2000 to 2020 include Georgetown (27%) and Florence (12%). In both the Little Pee Dee and Waccamaw sub-basins, both estimates of growth were in Horry County at 19% and 26%, respectively (Table 2).

Table 2: Estimated Population Growth

Sub-basin	2000 Population estimate	2020 Population Estimate	% Increase
Pee Dee	227,200	271,000	19
Little Pee Dee	75,500	86,000	13
Waccamaw	206,700	261,000	26

The proposed impact will create potential growth opportunities throughout the Pee Dee River Basin, especially near interchanges.

3.4 Watershed Needs and Threats

The SCDNR Little Pee Dee-Lumber Focus Area plan identifies habitat fragmentation via land conversions from typical agriculture practices to non-traditional uses, development and poor land management practices as a key threat to areas within the watershed. Notably, the plan identifies that these land use changes negatively impact aquatic habitat by increasing silt and sediment loads, introducing excessive nutrients and contaminants, and altering water quality due to irrigation and instream habitat due to stream sand mining. The proposed impact will impact a variety of habitat types and create habitat fragmentation; however, the chosen route will reduce the overall amount of floodplain encroachment and wetland impacts of the entire I-73 project.

The SCDHEC Watershed Water Quality Assessment for the Pee Dee River Basin identifies nine activities or conditions that pose a threat to water quality. These include agriculture, silviculture, urban areas, marinas and recreational boating, mining, hydro-modification (stream channelization, channel modification, and dam construction), wetland loss, land disposal (landfills), and groundwater contamination. The I-73 corridor is located predominantly in undeveloped areas where activities that threaten water quality are mainly agriculture, silviculture, and hydro-modification.

Wetlands and streams within the four-county I-73 study area have been severely impacted by historic and ongoing agricultural and silvicultural activities. This is especially true of the streams identified within the construction footprint of the I-73 project. The most prevalent impacts to streams observed within the project study area consisted of channelization/straightening of streams and disconnection from their floodplains. Nearly 98.5 percent of the stream impacts and 89.1 percent of the wetland impacts associated with the I-73 project occurs along the proposed alignment south of I-95; therefore, the southern portion of the project study area was targeted for mitigation.

As a part of SCDHEC's Watershed Water-Quality Assessment program, 29 surface-water sites were sampled in the Little Pee Dee River sub-basin in 2003 in order to assess the water's suitability for aquatic life and recreational use. Aquatic-life uses were fully supported at 21 sites, or 72% of the water bodies sampled in this sub-basin; most of the impaired water exhibited dissolved oxygen levels below the concentrations needed to support aquatic life. Recreational use was fully supported in 78% of the sampled water bodies; the water bodies that did not support recreational use exhibited high levels of fecal-coliform bacteria (Table 3).

Table 3: Little Pee Dee Impaired Waters

Water Body Name	Station Number	Use	Status	Water Quality Indicator
Bear Swamp	PD-368	Aquatic Life	Nonsupporting	Dissolved oxygen
Little Pee Dee River	PD-365	Aquatic Life	Nonsupporting	pH
Buck Swamp	PD-031	Recreation	Partially supporting	Fecal coliform
Little Pee Dee River	PD-029E	Recreation	Partially supporting	Fecal coliform
	PD-030A	Aquatic Life	Nonsupporting	Dissolved oxygen
		Recreation	Partially supporting	Fecal coliform
	PD-348	Aquatic Life	Nonsupporting	pH
	PD-052	Aquatic Life	Partially supporting	Copper
Maple Swamp	PD-030	Recreation	Partially supporting	Fecal coliform
Loosing Swamp	RS-03513	Aquatic Life	Nonsupporting	Dissolved oxygen
Chinners Swamp	PD-352	Recreation	Partially supporting	Fecal coliform
White Oak Creek	PD-037	Aquatic Life	Partially supporting	Dissolved oxygen
		Recreation	Partially supporting	Fecal coliform
Little Pee Dee River	PD042	Aquatic Life	Nonsupporting	Dissolved oxygen and pH

According to SCDHEC's online Watershed Atlas tool, there are 20 NDPES permits and five approved TMDLs within the boundaries of the Little Pee Dee-Lumber Focus Area (Table 2). The five TMDLs are found at the following: one at the Little Pee Dee River at state road S-17-23, one at Maple Swamp at SC Highway 57, one at the Little Pee Dee River below the junction with Maple Swamp, one at White Oak Creek at state road S-34-31and one at Chinners Swamp at Gunter's Island Road off of state road S-26-99 all due to fecal coliform. SCDHEC has assigned fish consumption advisories on the Little Pee Dee and Lumber Rivers due to high mercury levels. There should be no consumption of blue catfish, flathead catfish, bowfin, chain pickerel or largemouth bass in the Little Pee Dee from the NC-SC State Line to its confluence with the Great Pee Dee River and all other fish species should only be eaten once a week. On the Lumber River from the NC-SC State Line to the confluence with the Little Pee Dee, no bowfin, channel catfish, flathead catfish or largemouth bass should be eaten. Chain pickerel and redear sunfish should only be eaten once a week and bluegill once a month from the Lumber River.

For more detail on the sites listed as a part of SCDHEC's Watershed-Water Quality Assessment, visit http://gis.dhec.sc.gov/watersheds/

Table 4: SCDHEC Impaired Waters Permits

Permit #	Type	Name
SC0021776	Municipal	Dillon/Little Pee Dee
SC0022284	Municipal	Lake View Wastewater Treatment Facility
SC0025348	Municipal	GSW&SA/Loris Wastewater Treatment Facility
SC0025402	Municipal	Town of Latta
SC0029408	Municipal	Mullins/White Oak Creek Wastewater Treatment Facility
SC0031801	Domestic	South of the Border Motel
SC0041963	Municipal	McColl Waste Water Treatment Facility
SCG250256	Industrial	Baldor Electric Company
SCG570006	Municipal	GSW&SA/Town of Nichols
SCG646037	Industrial	Trico/Tanner Water Treatment Plant
SCG646038	Municipal	Trico/Bobby Byrd Water Treatment Plant
SCG646045	Municipal	Trico/Hamer Water Treatment Plant
SCG646056	Industrial	Trico Water Company Fairfield Plant
SCG646075	Municipal	Bucksport Water System Pauley Swamp
SCG731136	Industrial	GSWSA/Hwy 917 Pit Mine

SCG730635	Industrial	Superior Sand/Black Creek Mine
SCG731235	Industrial	Inland Sand Mine
ND0080721	Domestic	Locust Tree Development
SCG730043	Industrial	Carolina Sand/Britton's Neck
SCG731082	Industrial	D&L/Pee Dee Crossroads Mine

4.0 PROPOSED COMPENSATORY MITIGATION PLAN

The components of a complete mitigation plan are identified in the Mitigation Rule (33 CFR 332.4(c)). The following sections provide additional local guidance about the information that will be required to review and approve a PRM plan.

4.1 Goals and Objectives

The purpose of this mitigation plan is to provide compensatory mitigation for the impact of 4,643 linear feet of stream and 342.3 acres of wetlands with the development of I-73. Mitigation will be accomplished by preserving the entirety of Gunter's Island, 6,134 acres, with 89,836 linear feet of stream preservation and/or enhancement and 4,583.1 acres of wetland preservation.

The 2008 Mitigation Rule, 33 C.F.R.Parts 325 and 332 and 40 C.F.R.Part 230, directs the District Engineer (DE) to consider what would be "practical ...capable[,]... and environmentally preferable" when evaluating compensatory mitigation options (33 C.F.R.§ 332.3 (a)(l)). The Rule establishes the following hierarchy/preference for mitigation:

1. Mitigation Bank Credits
2. In-Lieu- Fee Program Credits
3. Permittee Responsible Mitigation (PRM)

Notwithstanding this preference, the Rule also provides that "[w]here permitted impacts are not in the service area of an approved mitigation bank or in-lieu-fee program that has the appropriate number and resource type of credits available, permittee responsible mitigation is the only option" (33 C.F.R. § 332.3(b)(4)) . As mitigation banks did not provide enough credits or were applicable to the appropriate watershed and in the absence of in-lieu fee opportunities in South Carolina, permittee responsible mitigation was the only option.

The PRM site that SCDOT proposes to use, accomplishes in-kind mitigation, by protecting similar wetland and stream resources to the impacted resources. The Rule authorizes the DE to consider and accept off-site and/or out-of-kind mitigation opportunities, including those in adjacent watersheds that have a "greater likelihood of offsetting project impacts" or are "environmentally preferable" (33 C.F.R. § 332.3(b)(6)). SCDOT proposes in this document off-site, in-kind and in-watershed mitigation accomplished through the preservation of outstanding aquatic resources. Given the nature of the PRM plan resources, the DE has ample foundation to conclude that this plan is "environmentally preferable."

The preservation of the Gunter's Island site is consistent with the criteria outlined in the Rule listed below that would allow mitigation through preservation in the sound discretion of the DE (33 C.F.R. § 332.3(f)):

- Resources to be preserved provide important physical, chemical and biological functions and contribute significantly to the ecological sustainability of the watershed;
- The DE determines preservation is appropriate and practicable;
- Resources to be preserved are under threat of destruction or adverse modification; and
- The proposed preservation sites will be permanently protected by third party conservation easement or title transfer to a state resource agency or land trust.

Additionally, the Rule provides that preservation alone may compensate for permitted impacts to aquatic resources "where preservation has been identified as high priority using the watershed approach ..."(33 C.F.R. § 332.3(h)(2)). The Site proposed by SCDOT is consistent with these criteria. SCDOT has proposed mitigation using outstanding resources within their watersheds. Moreover, in determining the suitability of a mitigation site, the DE is to consider a number of factors described at 332.3(d), including, "local or regional goals for restoration or protection of particular habitat types or functions." The coordination and consultation process that SCDOT conducted with non-governmental organizations (NGO) and state and federal agencies provided direction to find a site that is regionally significant and especially warrants the protection that the I-73 mitigation plan will provide.

As specified in 33 C.F.R. § 332.3 (f) of the Rule, the DE must be satisfied that the type and amount of mitigation provided will compensate for project impacts. This plan demonstrates that the mitigation offered compensates for impacts resulting from the I-73 in excess of 13:1 for wetlands and 19:1 for streams, and by virtue of the details of the aquatic, cultural, historic and regionally significant resources that are included.

In addition to the entire preservation of the tract and the streams and wetlands within, SCDOT proposes to conduct further enhancement, with continued input and collaboration with the resource agencies and ACT team, possibly in the form of, but not limited to, the following:

- replacement or removal of culverts, bridges and or roads impeding stream flow,
- bank stabilization along reaches upstream and downstream of stream crossings,
- supplemental plantings along the floodplain and within wetlands and their buffers.

The selection of the Gunter's Island tract is a large-scale mitigation opportunity with regional importance based on a watershed approach to protect water quality and aquatic resources in accordance with the 2008 Mitigation Rule (33 CFR Parts 325 and 332, 40 CFR Part 230). As such, the significant benefits obtained by protection of the mitigation resources warrants flexibility in the level of detail appropriate to compare the resources impacted to the compensatory mitigation resources. The Rule describes the components of a mitigation plan (33 C.F.R. § 332.4(c)). These components, as they are applicable to the proposed I-73 Compensatory Mitigation Plan, are discussed below.

In an effort to promote the environmental stewardship in transportation projects and expedite environmental review of high-priority transportation infrastructure (Executive Order 13274, 2002), the FHWA and SCDOT formed the ACT on July 30, 2004. The ACT was a group of representatives from state and federal cooperating agencies that provided input and helped make project decisions including those that pertained to wetland and stream impacts and the concomitant mitigation approach. Mitigation was discussed at several ACT meetings and additional meetings were conducted to specifically discuss mitigation (see Chapter 4.2 of the FEISs for a summary of the ACT meetings). The importance of in-kind mitigation and mitigation within the same watershed was emphasized. The proximity of the mitigation site to the impact site, the type of protection the site will receive, and whether the mitigation wetland or stream is the same type as the impacted wetland or stream were considered.

> "A watershed approach to mitigation considers the importance of landscape position and resource type of mitigation projects for the sustainability of aquatic resource functions within the watershed. It considers how the types and locations of compensatory mitigation projects will provide the desired aquatic resource functions, and function over time in a changing landscape. Considerations include:
>
> - Habitat requirements of important species
> - Habitat loss or conversion trends
> - Sources of watershed impairment
> - Current development trends
> - Requirements of other regulatory and non-regulatory programs that affect the watershed, such as storm water management or habitat conservation programs.
>
> A watershed approach includes the protection and maintenance of terrestrial resources, such as riparian areas and uplands, when those resources contribute to the overall ecological functioning of aquatic resources in the watershed."

Construction of I-73 will result in approximately 342.3 acres of wetland fill and 4,643 linear feet of stream impacts. Coordination with the affected communities, various agencies and NGO's during this process has resulted in identification and development of this mitigation plan that fully and adequately compensates for all unavoidable impacts.

To the maximum extent practicable, the proposed compensatory mitigation provides "in-kind" mitigation to offset the proposed impacts in that the proposed preservation sites contain resources that are:

- the same functional classification (e.g. Cowardin classification or stream order),
- within the same watershed or ecoregion as the impacted resource, and
- located within the same or similar landscape as the impacts associated with I-73 construction.

As stated before, the mitigation site, Gunter's Island is located within the Little Pee Dee sub-basin where 74% of the wetland and 78% of the stream impacts occur and will mitigate thirteen times greater the amount of stream and wetlands to be impacted.

4.2.1 Ecological Suitability and Watershed-Scale Features

As discussed previously, the Gunter's Island acquisition will preserve 89,836 linear feet of stream and 4,583.1 acres of wetland and their associated buffers enhancing ecological connectivity within the Little Pee Dee-Lumber Focus Area, providing water quality protection along 11 miles of the Little Pee Dee River and initiating the conservation of up to 5,000 more acres within the river corridor.

Proximity to Hydrologic Sources and Water Rights

Anticipated mitigation activities are not dependent on hydrologic sources and include preserving all the wetlands and streams onsite with additional enhancement activities such as replacement or removal of culverts, bridges and or roads impeding stream flow, bank stabilization along reaches upstream and downstream of stream crossings, and supplemental plantings along the floodplain and within wetlands and their buffers. Once the tract is transferred to SCDNR under the Heritage Trust Program, it will be managed under traditional natural resource management practices, similar to those utilized in both the Little Pee Dee Heritage Preserve and the Woodbury Wildlife Management Area nearby.

Historical aerial photographs were obtained for the years of 1938, 1963, 1973, 1983, 1994, 1999, and 2006 from the University of South Carolina's Digital Map Collections, South Carolina Aerial Photographs Indexes and from SCDNR. Land use practices maintaining forested corridors for recreational hunting, wildlife and timber management activities have remained fairly consistent since 1963. Based on the aerial photos, impervious area within the Site has changed very little over the past fifty years. Stream hydrology has been adversely affected by road crossings associated with timber management (i.e., harvesting and planting of pine). Timber management most likely included the harvest of existing soft and hardwood species, minor topography modifications, and replanting.

The quality and scale of the aerial photographs prevents the determination of an accurate date for the development of the stream crossings. However, roads are apparent in several aerial photographs. Based on site visits and field notes, it is likely undersized culverts initially installed have been maintained since construction. These maintenance activities have adversely affected surface water hydrology and floodplain attenuation on portions of the tract. Under the management of SCDNR, the tract will be managed appropriately following best management practices and further meet watershed goals.

4.2.4 Anticipated Ecological Uplift

Potential ecological uplift provided by the preservation of Gunter's Island is listed below.

- Protects water quality by preserving all streams (89,836 linear feet) and wetland features (4583.1 acres).
- Protects an intact Carolina Bay.
- Protects water quality within the streams and wetland features onsite and the adjacent Little Pee Dee River by increasing the amount of protected lands. The Little Pee Dee River is designated as an Outstanding Water Resource (ORW) by SCDHEC and an Aquatic Resource of National Importance (ARNI) by the USEPA.
- Provides additional habitat connectivity along the Little Pee Dee River in the Little Pee Dee-Lumber Focus Area.
- Provides additional habitat connectivity for state protected lands as a portion of Gunter's Island is upstream and across the Great Pee Dee River from Woodbury Wildlife Management Area, another portion adjacent to the 200 acre Johnson tract of the Little Pee Dee Heritage Preserve and approximately 3 miles south of the remaining acreage of the Little Pee Dee Heritage Preserve.
- Enhances public benefits by providing areas for recreational fishing and waterfowl hunting opportunities as there are two boat landings on the Little Pee Dee River and non-consumptive recreational opportunities such as hiking and wildlife watching.
- Protects 11 miles of river corridor along the Little Pee Dee River.

4.2.5 Cultural Resources

Based on GIS data from the State Historic Preservation Office (SHPO), the Gunter's Island Tract contains a single point located at Hughes Landing that was deemed ineligible for listing on the National Register of Historic Places (NRHP) (Figure 10). Several other structures located near the site are considered to be contributing to an eligible district, but not on the NRHP.

Due to the position on the landscape and the history of the area, it is likely other cultural resources, yet to be identified, are present. Consultation under Section 106 of the National Historic Preservation Act of 1966 (as amended) will occur with the (SHPO) and Catawba Indian Nation Tribal Historic Preservation Office (THPO). Any areas associated with wetland or stream enhancement/restoration activities that involve excavation or any other ground disturbing activity will be surveyed by a qualified archaeologist prior to restoration/enhancement implementation.

[illegible] Protected Species

SCDNR's Heritage Trust Database yielded two occurrences of the federally at risk Rafinesque's big-eared bat (*Corynorthinus rafinesquii*) and the federally protected Bald Eagle (*Haliaeetus leucocephalus*) within 4-6 miles from Gunter's Island (Figure 11). Additionally, there are also documented wading bird colonies within 3-8 miles and a 2004 documented Wood Stork (*Mycteria americana*) colony approximately 10 miles to the southwest with 174 nests observed in the rookery. Therefore, it is likely Wood Storks are present within the project area, utilizing inundated wetlands and ditches for foraging. Protection of this tract may also protect and enhance habitat for federally endangered Shortnose (*Acipenser brevirostrum*) and Atlantic Sturgeon (*Acipenser oxyrinchus*) who utilize the Great Pee Dee River.

SCDNR's Stream Assessment data from sampling within both the Palmetto and Juniper Swamps, that drain into the Gunter's Island tract, provided that the American Eel (*Anguilla rostrata*), a South Carolina Wildlife Action Plan (SWAP) priority species, one of greatest conservation need not traditionally covered under any federal funded programs were also present. Species are listed in the SWAP because they are

- rare or designated as at-risk due to knowledge deficiencies,
- species common in South Carolina but listed rare or declining elsewhere,
- or species that serve as indicators of detrimental environmental conditions.

Other SWAP priority species that readily utilize the Little Pee Dee River along Gunter's Island are American Shad (*Alosa sapidissima*), Blueback Herring (*Alosa aestivalis*) and Hickory Shad (*Alosa mediocris*) which are all an important prey base for predatory fish species and a variety of piscivorous birds. Protection of the river corridor in the Little Pee Dee drainage is also critical habitat for black bear (*Ursus americanus*) and Swallow-tailed Kite (*Elanoides forficatus*).

The tract provides valuable habitat for deer, turkey and numerous non-game species as well as wintering habitat for a wide variety of waterfowl including Wood Ducks (*Aix sponsa*), Hooded Mergansers (*Lophodytes cucullatus*), Mallards (*Anas platyrhynchos*), Green-winged Teal (*Anas carolinensis*) and Ringed-necked Ducks (*Aytha collaris*). The forested wetlands also provide important nesting and migration habitat for a large assemblage of migratory birds. SCDNR has documented breeding of 15 species of neo-tropical migratory birds and 35 species of other upland birds on the Little Pee Dee River Heritage Preserve just upstream and the Woodbury Wildlife Management Area a designated Important Bird Area by the Audobon Society, just across the river from Gunter's Island.

Acquisition and protection of the Gunter's Island tract would complement the larger conservation initiatives of the Little Pee Dee-Lumber River Focus Area and the adjacent Winyah Bay Focus Area. Protection would also provide many public health benefits including diverse recreational opportunities such as bird watching, canoeing, hunting, fishing and further protection of a scenic watershed. Table 5 provides the most recent list of federal and state protected species for Horry County

Table 5: Horry County Protected Species

Common Name	Scientific Name
Bird	
American wood stork (T)	*Mycteria americana*
Bald Eagle (BEGA)	*Haliaeetus leucocephalus*
Black rail (ARS)	*Laterallus jamaicensis*
Red-cockaded woodpecker	*Picoides borealis*
Fish	
American Eel	*Anguilla rostrata*
Atlantic Sturgeon (E)	*Acipenser oxyrinchus*
Blueback Herring (ARS)	*Alosa aestivalis*

Carolina Pygmy Sunfish (ARS)	*Elassoma boehlkei*
Robust Redhorse (ARS)	*Moxostoma robustum*
Shortnose Sturgeon (E)	*Acipenser brevirostrum*
Insect	
Monarch butterfly (ARS)	*Danaus plexippus*
Rare skipper (ARS)	*Problema bulenta*
Mammal	
Rafinesue's big-eared bat	*Corynorthinus rafinesquii*
Tri-colored bag (ARS*)	*Perimyotis subflavus*
Mollusk	
Savannah Lilliput (ARS)	*Toxoplasma pullus*
Waccamaw Fatmucket (ARS)	*Lampsilis fullerkati*
Plant	
American chaffseed (E)	*Schwalbea Americana*
Canby's dropwort (E)	*Oxypolis canbyi*
Carolina-birds-in-a-nest (ARS)	*Macbridea caroliniana*
Ciliate-leaf tickseed (ARS)	*Coreopsis integrifolia*
Godfrey's stitchwort (ARS)	*Minuartia godfreyi*
Harper's fimbristylis (ARS)	*Fimbristylis perpusilla*
Long Beach seedbox (ARS)	*Ludwigia brevipes*
Pondberry (E)	*Lindera melissifolia*
Seabeach amaranth (T)	*Amaranthus pumilus*
Venus flytrap (ARS*)	*Dionaea muscipula*
Wire-leaved dropseed (ARS)	*Sporobolus teretifolius*
Yellow pond lily (ARS)	*Nuphar lutea ssp. Sagittifolia*
Reptile	
Southern hognose snake	*Heterdon simus*
Spotted turtle (ARS)	*Clemmys guttata*

At Risk Species (ARS): Species that the FWS has been petitioned to list and for which a positive 90-day finding has been issued (listing may be warranted); information is provided only for conservation actions as no Federal protections currently exist.

ARS*: Species that are either former Candidate Species or are emerging conservation priority species

Bald & Golden Eagle Protection Act (BGEPA): Federally protected under the Bald and Golden Eagle Protection Act

Critical Habitat (CH)

Federally Endangered (E)
Federally Threatened (T)

4.3 Site Protection

It is proposed and intended that the identified mitigation site be held in the fee simple ownership of SCDNR and the Heritage Trust Program. The Heritage Trust Program is a system dedicated to inventorying, preserving, using and managing "outstanding natural or cultural areas and features" in South Carolina. Properties generally enter the Heritage Trust Program through dedication. Dedication occurs through acquisition, which is fee simple transfer of the property, or acceptance, which is a transfer of less than a fee simple interest in the property, such as a conservation easement. Properties dedicated to the Heritage Trust Program through acquisition must be protected in perpetuity. When a property is dedicated, the owner that retains any interest in the property enters into a Dedication Agreement with SCDNR that clearly states any restrictions, conditions, permissive and non-permissive uses. The Dedication Agreement and any other property restrictions are recorded in the county real estate records to complete the dedication into the Heritage Trust Program. SCDOT will work with SCDNR to arrange a fee simple interest in the mitigation site through the Heritage Trust Program. Based on baseline evaluations, Gunter's Island would qualify as a Heritage Trust Preserve. In accordance with S.C. Code of Laws §51-17-80 "[t]he following restrictions shall apply to all Heritage Preserves:"

> The primary dedication as a Heritage Preserve shall be to preserve and protect the natural or cultural character of any area or feature so established. The board of the department and its agents shall in all cases maintain the essential character of any area or feature dedicated, and as such they are hereby declared to be at their highest, best and most important use for the public benefit. No Heritage Preserve shall be taken for any other public purpose unless the approval of both the board of the department and the Governor has been obtained. In no case shall any Heritage Preserve be taken for any private use.

SCDOT will work with SCDNR and the USACE to establish appropriate conditions on the fee simple transfer of the entire site to the SCDNR to satisfy these requirements. An example of the

Long Term Site Protection Agreement utilized in a similar landscape scale mitigation plan for Haile Gold Mine is included as Appendix C.

4.4 Baseline Information and Conditions

4.4.1 Project Site

The I-73 corridor runs through four counties (Dillon, Horry, Marion and Marlboro) in the northeastern section of South Carolina (Figure 1). The corridor runs for approximately 75 mile from the border with North Carolina just north of Bennettsville in Marlboro County (33.792260, -79.0660296), south towards the town of Latta and thence southeast of the town of Aynor and north of the City of Conway in Horry County to intersect with SC 22 (33.940903, -79.062486). The corridor is located primarily within two EPA Level III Ecoregions: Southeastern Plains and Middle Atlantic Coastal Plains (Figure 2). As previously mentioned, the corridor is located within three 8-digit HUC watersheds: Pee Dee (03040201), Little Pee Dee (03040204) and Waccamaw (03040206). The corridor is primarily rural in character with upland forest and agricultural lands interlaced with low lying drainages, and dotted with small cities and towns including Bennettsville, Marion, Mullins and Aynor, as well as numerous smaller communities. Vegetation community types vary throughout the corridor and consist primarily of natural and managed pine forests, deciduous upland forests, forested and non-forested wetlands, pasture and agricultural field borders.

The corridor crosses the Little Pee Dee River, Lake Swamp and numerous smaller streams, wetland and open water habitats. These proposed new alignment crossings would constitute a major fragmentation of aquatic habitat across the entire Pee Dee Region. Aquatic resources occurring within the corridor as described by Nelson include aquatic beds, bay forest, bottomland hardwoods, deciduous shrub swamp, freshwater marsh, pine wet flatwoods, ponds, borrow pits, rivers, canals, and wooded swamp. Detailed information of aquatic habitat types may be found in the FEISs.

Aquatic habitats within the Little Pee Dee-Lumber Focus Area, which include both the impact and mitigation sites, are described as being

> "defined by classic blackwater river floodplain forests with canopies of bald cypress (*Taxodium distichum*), swamp tupelo (*Nyssa biflora*) and red maple (*Acer rubrum*). Other species commonly associated include tulip poplar (*Liriodendron tulipfera*), sweet gum (*Liquidambar styraciflua*), pond pine (*Pinus serotina*), loblolly pine (*P. taeda*) and laurel oak (*Quercus laurifolia*). Floodplain forests are seasonally

inundated by the river and represent the most deeply flooded of all southeastern United States forest types. The shrub layer in areas subjected to frequent flooding is open, wherease areas with infrequent flooding may be fairly dense and pocosin-like.

The Little Pee Dee and Lumber rivers' bottomland hardwood forests typically occur between the floodplain forest and drier upland sites. Unlike floodplain forests and longleaf pine (*P. palustris*) uplands, bottomland hardwoods are quite diverse in terms of the number of overstory species. This ecotype is dominated by a well-developed canopy of water oak (*Quercus nigra*), overcup oak (*Q. lyrata*), willow oak (*Q. phellos*), sweetgum, water hickory (*Carya aquatica*) and loblolly pine. Bottomland hardwood forests are inundated regularly by the river, but do not typically contain standing water for extended periods of time. The drier conditions result in a better developed herbaceous layer. Loose spangle grass (*Uniola laxa*) often develops thick stands in open areas.

Some of the most significant resources of the study area are probably the geomorphic features, the oxbow lakes, sloughs, braided streams, sand ridges and other fluvial formations that have been created by the river within the floodplain. These type features are not unusual on Coastal Plain blackwater rivers; however, the Little Pee Dee and Lumber Rivers have an unusually numerous and well developed array of fluvial formations. Many of these features can be directly accessed from the main river channel. Oxbow lakes are often associated with floodplain forests. Oxbow lakes are former sections of river channel that became isolated when the river changed course.

There are several excellent examples of oxbow lakes along the Little Pee Dee River. Elevated xeric sand ridges run parallel to the rivers throughout the floodplain. This ecosystem is associated with fluvial sand deposited by river currents. The soils are sandy and well drained. Longleaf and sparse loblolly pine dominate the canopy. The mid-story consists primarily of turkey oak (*Q. laevis*), sand live oak (*Q. virginiana var. germinata*) and persimmon (*Diospyros virginiana*). Common understory plants include wiregrass (*Aristida stricta*), dropseed (*Sporobolus spp.*), and prickly-pear (*Opuntia compressa*). The protection of these ridges is essential to the health of the overall aquatic system."

Generally, uplands throughout the I-73 corridor are characterized by dry sandy hillsides, much of which have been timbered, in successional regeneration or are in planted pine production. Generally these areas have been recently cleared and/or may be dominated by such species as loblolly pinewhite oak (*Q. alba*), post oak (*Q. stellate*), blackjack oak (*Q. marilandica*), dewberry (*Rubus fragellaris*) and American beech (*Fagus grandifolia*). Additional uplands are located in topographically lower areas and along the bottom of hillsides. These areas tend to exhibit slightly higher percentage of hydrophytic vegetation but lack hydric soil and hydrology indicators associated with wetlands. Generally these areas are dominated by forest communities consisting of red maple, sweet-gum (*Liquidambar styraciflua*), and American holly, (*Ilex opaca*).

4.4.2 Mitigation Site

The Gunter's Island Tract is located in western Horry County on the border with Marion County along the Little Pee Dee River. The site is situated west of the Town of Conway just north of US 378, east of SC 908, and west of Pee Dee Road near Jordanville, SC. (Figure 3). The Gunter's Island Tract is adjacent to the 200 acre Johnson Tract of the Little Pee Dee Heritage Preserve and just upstream of the approximately 26,000 acre Woodbury Wildlife Management Area. The Site is within the Little Pee Dee-Lumber River Focus Area and the Little Pee Dee Scenic River begins just downstream at the US 378 bridge (Figure 10).

The Gunter's Island Tract is a single parcel (28700000001) containing 6,134 deeded acres (Figure 4). The tract is located in the Middle Atlantic Coastal Plain EPA Level III ecoregion and the Little Pee Dee River watershed where 74 percent of the wetland impacts and 78 percent of the stream impacts occur (HUC 03040204) (Figure 9).

In total, the site contains approximately 5000 acres of forested wetland, 2 acres of emergent wetland, 42 acres of open water, and 1,814 acres of upland habitat (Figure 5).

The palustrine forested wetlands are characterized by hydric soil indicators and a mature canopy of hardwoods. The bottomland hardwoods are forested areas usually occurring within floodplains. Flooding in the bottomland hardwoods usually occurs during the winter and spring months. Wooded swamps are also associated with floodplains, occurring on low flats, oxbows and isolated ponds.

Wooded swamps usually occur during the growing season, but can last throughout the year. Developed canopy and sub-canopy species within these various wetland types include:

Table 6: Gunter's Island Wetland Tree Species

Common Name	Scientific Name
Bald Cypress	*Taxodium distichum*
Red Maple	*Acer rubrum*
River Birch	*Betula nigra*
Black Willow	*Salix nigra*
Laurel Oak	*Quercus laurifolia*
Willow Oak	*Quercus phellos*
Water Oak	*Quercus nigra*
Black Gum	*Nyssa silvatica*
Water Tupelo	*Nyssa aquatica*
Green Ash	*Fraxinus pennsylvanica*

The Gunter's Island Tract also includes an intact, 85-acre Carolina Bay, located in the northeastern section of the property. The bay appears to be recovering from previous timber harvest. Bay forests occur on peat soils and stay saturated for long periods of time throughout the growing season. Trees dominating the canopy within the bay include:

Table 7: Gunter's Island Carolina Bay Species

Common Name	Scientific Name
Bald Cypress	
Loblolly Pine	*Pinus taeda*
Red Maple	
River Birch	
Red Bay	*Persea borbonia*
Black Gum	*Nyssa sylvatica*
Swamp Chestnut Oak	*Quercus michauxii*

Numerous oxbow lakes dot the landscape comprising approximately 42 acres of open water. Oxbow lakes are often associated with floodplain forests, as these features are former sections of river channel that became isolated when the river changed course. The property contains approximately 12.48 miles of stream, including 11 miles of waterfront on the Little Pee Dee River, one of the most ecologically significant drainages in South Carolina. Most of these waters, including the Little Pee

Dee River, are designated as Outstanding Resource Waters by the state of South Carolina. The Little Pee Dee was also designated by the US EPA as an Aquatic Resource of National Importance.

The aquatic features and habitats cover the majority of the Gunter's Island tract; however, there are also approximately 1,550 acres of uplands. On most of which silviculture practices dominate the land use and vegetation community. Loblolly pine, red maple and sweet gum were noted as the dominate species in the transitional areas between wetland and silviculture. Dirt and gravel access roads, used for silviculture and hunting bisect the uplands and cross the wetlands in several locations. The remaining upland areas consist of elevated xeric sand ridges, where fluvial sand was deposited by river currents, that run parallel to the river within the floodplain. Soils are typically sandy and well-drained with longleaf and sparse loblolly pines dominating the canopy. The mid-story typically consists of turkey oak, live oak, and persimmon. Common under story plants include wiregrass, dropseed, and prickly-pear. The protection of these ridges is essential to the health of the overall aquatic system.

4.5 Mitigation Work Plan

Upon issuance of the relevant state and federal permits and authorizations to construct I-73 and prior to the start of any construction, SCDOT will continue to coordinate with SCDNR to get the site incorporated into the Heritage Trust Program as a "Heritage Preserve." A fee simple title transfer is anticipated as well as a "Long-Term Site Protection Agreement." The preservation and enhancement activities will commence after the site is dedicated and incorporated into the Heritage Trust Program. Following dedication of the property, SCDNR will have one year to complete baseline data assessments of the property for development of a work plan. The work plan will provide information on the restoration/enhancement activities, performance standards, monitoring requirements and a timeline for completion. This work plan will be provided to the Corps for review and approval prior to implementation for any restoration/enhancement work.

4.5.1 Stream Preservation

Beyond enhancing the streams at the crossings, approximately 89,686 linear feet, will be preserved in their present state.

4.5.2 Stream Enhancement

Approximately 150 feet of stream will be enhanced to include the replacement or removal of undersize and/or perched culverts, bridges, and/or roads that are impeding flow, and bank stabilization along reaches upstream and downstream of stream crossings. These interconnected braided stream and wetland systems convey large volumes of ground and surface water to the Little Pee Dee River, except during extreme flood events. Enhancing stream crossings will reduce channel incision and aggradation, plugging due to woody debris, and scour and moderate flows through restrictive openings which all impede aquatic movement and connectivity and sediment transport and deposition.

4.5.3 Wetland Preservation

The palustrine forested wetlands are primarily bottomland hardwoods characterized by hydric soil and a mature canopy. Approximately 4,583.1 acres of wetland total will preserved, with forested wetlands comprising 94 percent of the Gunter's Island tract and 5% scrub shrub and 1% emergent (Figure 6). The wetland preservation will comply with §332.3(h)l of the mitigation regulations as the preservation of the bottomland hardwoods provide important physical, chemical, and biological functions for the watershed. As previously discussed, the FEISs for the I-73 recommend landscape scale mitigation to offset the impacts associated with the project. By preserving all the wetlands onsite, Gunter's Island will continue to function in perpetuity to filter sediments and pollutants protecting water quality.

The goal to use landscape scale mitigation is also consistent with the Horry County Comprehensive Plan which emphasizes the need for large, undisturbed tracts with various habitat types to support the diversity of wildlife and plant communities. Wetland ecosystems provide food and cover for wildlife and serve as a safe haven from predatory fish species for a suite of amphibians who rely on isolated wetlands or ephemeral pools for reproduction.

[illegible]

Based on a review of timber management data, aerial photography and soil survey information, there are approximately 1113.8 acres of planted pine (Figure 7) and numerous existing roads located in mapped hydric soils, including Johnston loam and Leon fine sand. Potential wetland enhancement/restoration could involve the removal of pine stands and replanting with appropriate wetland species; supplemental plantings along the floodplain and banks of enhanced stream channels; and the replacement or removal of undersized and/or perched culverts, bridges, and/or roads that are impairing natural hydrology.

4.6 Maintenance Plan

The following maintenance will be required to ensure the continued viability of the Site once the initial construction is completed. Until success has been documented and the final credits are released, the Contractor will notify the USACE and the SCDOT if any issues develop on the Site that requires maintenance. The Contractor will document the extent of the issue, measures taken to correct the issue, and whether the issue has been resolved in the annual monitoring report.

4.6.1 Invasive species

Invasive species, such as Chinese Privot (*Ligustrum sinense*), have not been documented within the Site. However, if invasive species are observed within newly-planted enhancement areas along stream corridors or in areas of planted pine removal, maintenance will be required.

4.6.2 Maintenance of Vegetative Enhancement Area

Vegetative enhancement may involve the replanting of native hardwood species within stream and/or wetland buffers disturbed during enhancement and restoration activities and the removal of planted pines and re-establishment of native vegetative communities. Volunteer species, particularly pines because of the local seed source, will be documented in these areas. If the density of volunteer pines becomes greater than that documented in reference data, maintenance may include clearing these volunteers with the use of herbicide treatments and/or small mechanical equipment.

Roads used as public access onsite will be maintained by SCDNR. Maintenance will include re-grading the roads to prevent standing water and application of pervious materials, if necessary. All proposed bridges and low flow crossings will be maintained to ensure continued access along the primary roads. Crossings of wetlands and streams will be maintained in a manner consistent with the proposed mitigation plan, allowing hydrologic connection through bridges or an appropriate substitute. Erosion and sediment control BMPs will be used during all road maintenance in proximity to wetlands and streams.

If access is required within a forested area to repair a structure, which cannot be accessed through an existing primary road or trail, a temporary access road will be installed. Approval from the USACE will be acquired prior to constructing the temporary access road within the Site. Impacts to existing mature trees and newly planted trees will be avoided and minimized. Prior to constructing the access road, trees to be avoided will be distinctly marked. Erosion and sediment control fencing will be used around all temporary access roads.

4.6.4 Maintenance of Road Crossings and Other Structures

The structural elements of the Site, such as the overall condition of the road crossings and other structures will be monitored to determine if maintenance of these structures is required. These structures will be maintained and/or repaired within or adjacent to the Site as necessary to achieve the objectives of PRM and comply with the provisions for protection to the Site. Replanting and slope stabilization will occur if needed after maintenance of ditch plugs.

4.6.5 Supplemental Plantings

Potential maintenance measures may include supplemental replanting along wetland and stream buffers affected by enhancement or restoration activities. If the planting areas do not meet the vegetation performance standards during the annual monitoring, the reason for the plant mortality will be identified and supplemental plantings may be added to the density specifications of the reference areas

[illegible]

SCDNR Heritage Preserve signs will be placed around the property. The Site boundary will also be demarcated in the field to prevent encroachments into the buffer. Distance between markers will not exceed 250-feet.

[illegible]

An ecologically-based standard will be used to determine whether the mitigation site is achieving its objectives. These standards will be developed as a part of the developed work plan submitted to the Corp for review and approval one year following dedication of the property as a Heritage Preserve.

Monitoring Requirements

Specific monitoring requirements for restoration or enhancement activities will be developed as part of the work plan submitted to the Corp for review and approval one year following dedication of the property as a Heritage Preserve. Monitoring may be suspended by the USACE upon determination of success criteria being met. The reports may include a narrative providing an overview of site conditions and function; design drawings, maps, or photographs to illustrate site conditions; and measures of the functions provided by the mitigation project. Photographs included will be labeled with dates and the direction from which the photo is taken. Maps may show the location of the mitigation site, locations of photographic reference points, and quadrats. The Applicant will include the following components in each monitoring report submitted after construction.

1. Name of party responsible (the Applicant, or their designated consultant) for conducting the monitoring and the date(s) of the inspection.
2. A brief description of the approved compensatory mitigation plan and the dates when specific mitigation activities were commenced and/or completed.
3. A paragraph describing whether the mitigation site is developing as expected, a description of the work conducted and whether success criteria are being met.
4. If one or more enhancement or restoration activities are not meeting the necessary performance standards, the Applicant will submit a description of the existing condition, identify the reason(s) that performance standards are not met, and submit a proposal to conduct remedial actions and bring the restoration or enhancement activity into compliance with the approved work plan.

[illegible]

Once performance standards have been met, no additional maintenance of proposed restoration or enhancement areas are anticipated. These areas will be protected in perpetuity as part of the approved USACE work plan, the Long Term Site Protection Agreement with USACE and DHEC and the Heritage Trust Program. Long-term management of Gunter's Island will be conducted, as determined necessary and appropriate, by SCDNR as the long-term steward under the Heritage Trust Program.

4.9.1 Ownership of Site

Gunter's Island SC, LLC currently owns the parcels on which the Site is located. Upon approval of the mitigation plan, SCDOT will purchase the property and transfer it to the Long-Term Steward, SCDNR.

4.9.2 Identity of Long-Term Steward

The Long-Term Steward is responsible for managing the property in accordance with the approved Long-Term Management Plan (see activities listed below). Following transfer of the tract to the SCDNR's Heritage Trust Program, SCDNR will enter into a Site Protection Instrument with SCDHEC and the USACE Charleston District for the long-term protection of the Site and its underlying property. The SCDNR will be the trustee for the property and manage it under a Heritage Preserve Management Plan developed by the agency.

4.9.3 Identification of Long-Term Management Activities

Long-term management by SCDNR will occur in accordance with the Site Protection Instrument and the mitigation plan, and as defined by South Carolina Code of Laws Title 51, Chapter 17. The required long-term management activities may include, but are not limited to, the items specified below:

- Site Inspections and Reporting - Inspections will ensure that signs on the property boundary and Site boundary remain intact. SCDNR will enforce trespass, vandalism and other laws of the State of South Carolina as observed within the Site.
- Management of Invasive Species - The presence of non-native, exotic, and invasive species will be monitored annually and, if necessary, controlled with herbicide treatments recommended for aquatic use and consistent with "Restrictions" included in the Site Protection Instrument.
- Access Road Maintenance - The primary access roads will be maintained on the property as part of the long-term management. The access roads are excluded from the mitigation Units.
- Management of Road Crossings and Other Structures - The SCDNR will be responsible for monitoring the structural elements of the Site, such as the overall condition of the road crossings and instream structures. The condition of each structure will be documented with photographs and included in the annual long-term management report. The Long-Term

Steward will maintain and repair the structures, as necessary to ensure the long-term success of the mitigation activities as described in the mitigation plan, notifying the USACE prior to any replacements.

4.9 Funding Mechanism

Any management activities following completion of the monitoring period and closure of the Site as specified in this mitigation plan will be funded through monetary appropriations by SCDNR and the Heritage Trust Program.

4.10 Conclusive Summary

The I-73 Mitigation Plan represents a unique opportunity to accomplish landscape scale conservation of outstanding resources, consistent with ongoing regional conservation efforts and goals in accordance with the 2008 Mitigation Rule.

The Mitigation Plan has identified a site that is a high priority for acquisition and preservation within the same watershed as the majority of the impacts from I-73 construction. The Site contains outstanding natural resources including:

- Relatively undisturbed ecosystems,
- Management for species of conservation concern,
- Unique landforms,
- Important scientific, educational, aesthetic or recreational characteristics, and
- Cultural resources.

The long-term preservation and habitat management of the Site and its outstanding aquatic and riparian resources under the Heritage Trust Program will contribute significantly to the sustainability of the watershed, providing important physical, chemical and biological functions and fully mitigating for lost aquatic resource functions and services as a result of the construction and operation of I-73.

4.11 References

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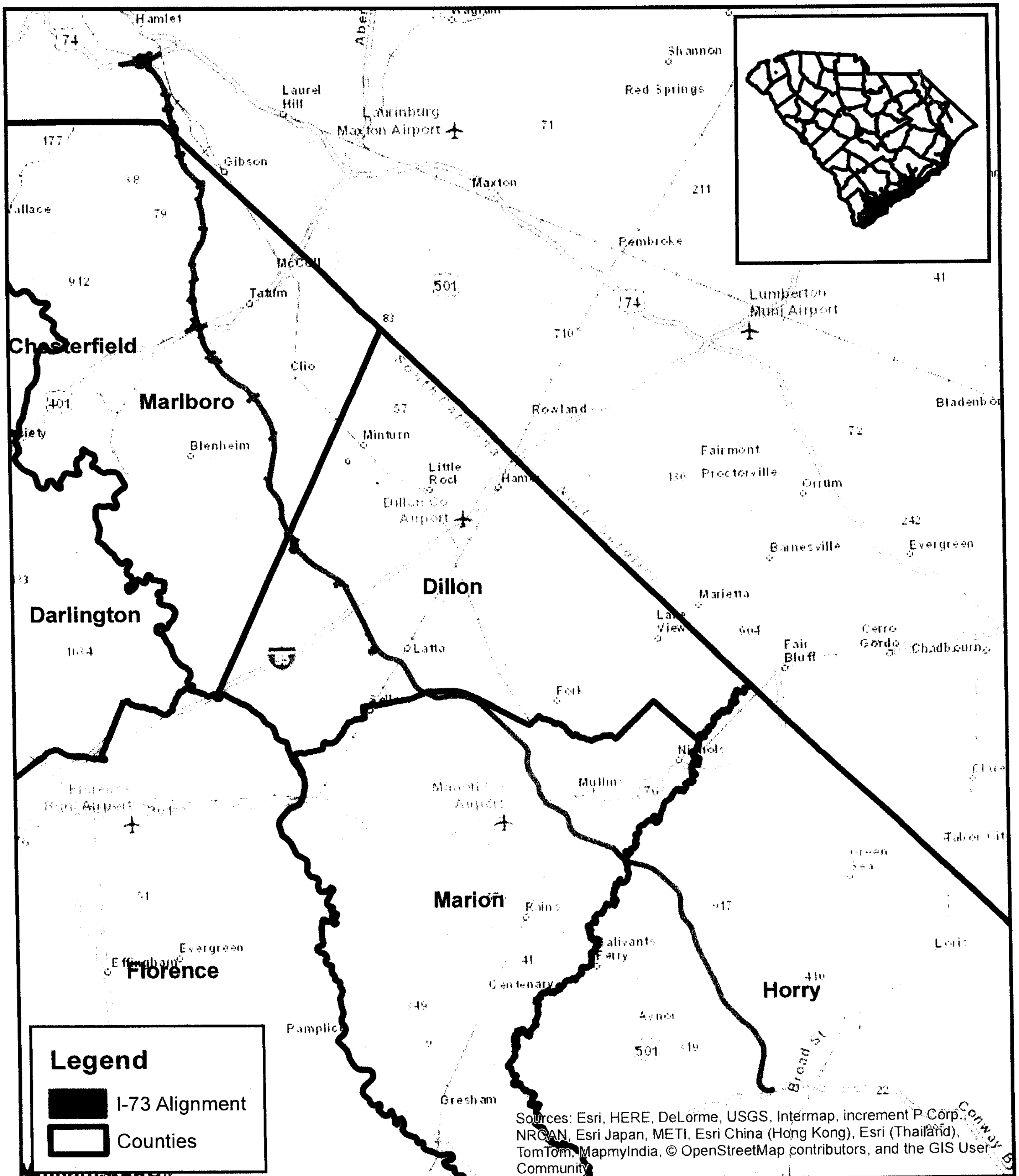
South Carolina Department of Natural Resources. SC State Wildlife Action Plan (SWAP). 2015

South Carolina Department of Health and Environmental Control.. Total Maximum Daily Load for Fecal Coliform for Hills Creek, Lynches River, North and South Branch of Wildcat Creek, Flat Creek, Turkey Creek, Nasty Branch, Gulley Branch, Smith Swamp, Little Pee Dee River, Maple Swamp, White Oak Creek and Chinners Swamp of the Pee Dee Basin, South Carolina Technical Report Number 029-05. September 2005.

South Carolina Department of Health and Environmental Control. Watershed Water Quality Assessment Pee Dee River Basin December 2007

Wachob, Andrew, A. Drennen Park, and Roy Newcome, Jr., South Carolina State Water Assessment Second Edition. South Carolina Department of Natural Resources. 2009.

Figures

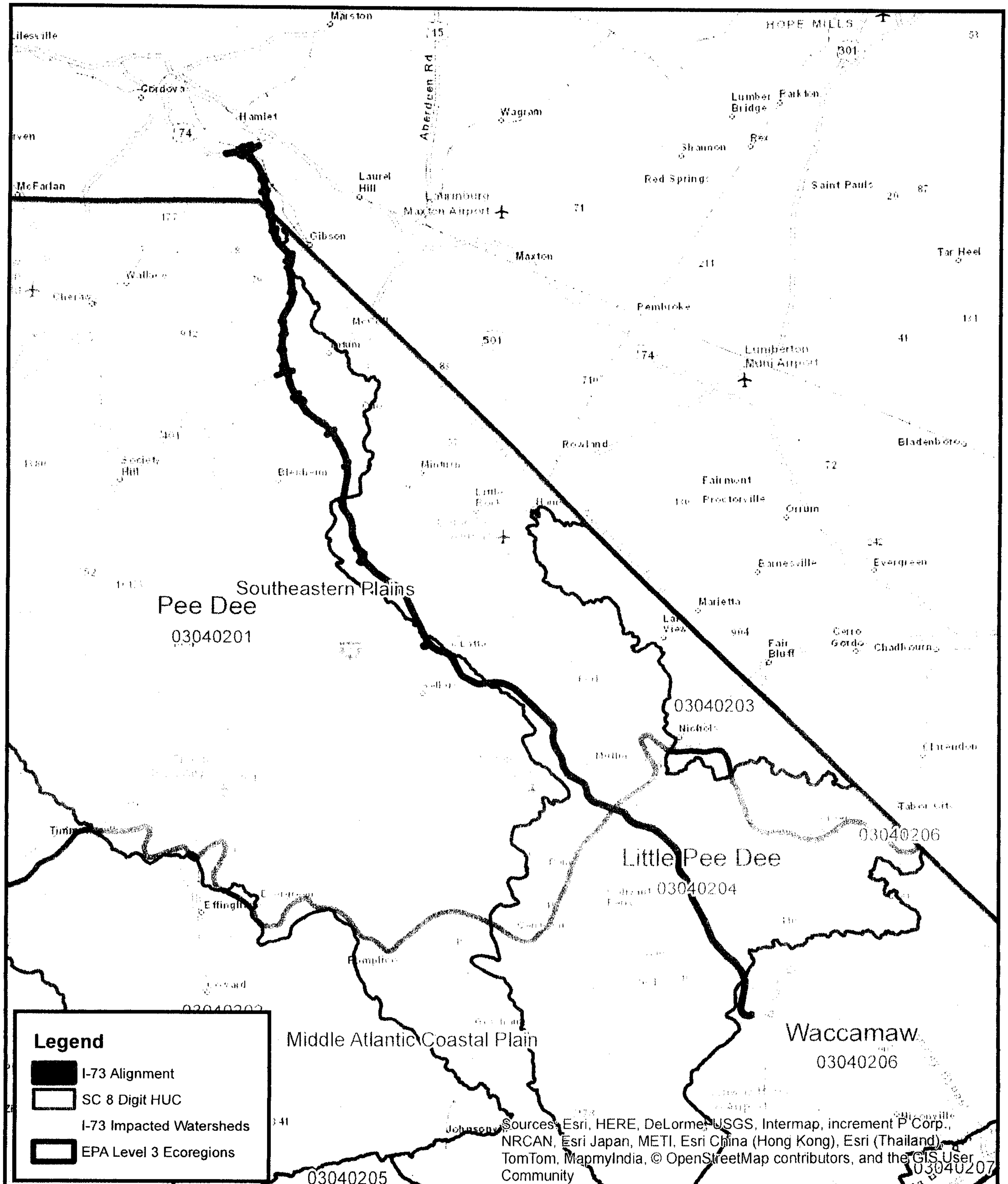


South Carolina Department of Transportation

Figure 1:
I-73 Location

I-73 Compensatory Mitigation Plan
Gunter's Island Tract

Date: January 13,2016



SCDOT
South Carolina Department of Transportation

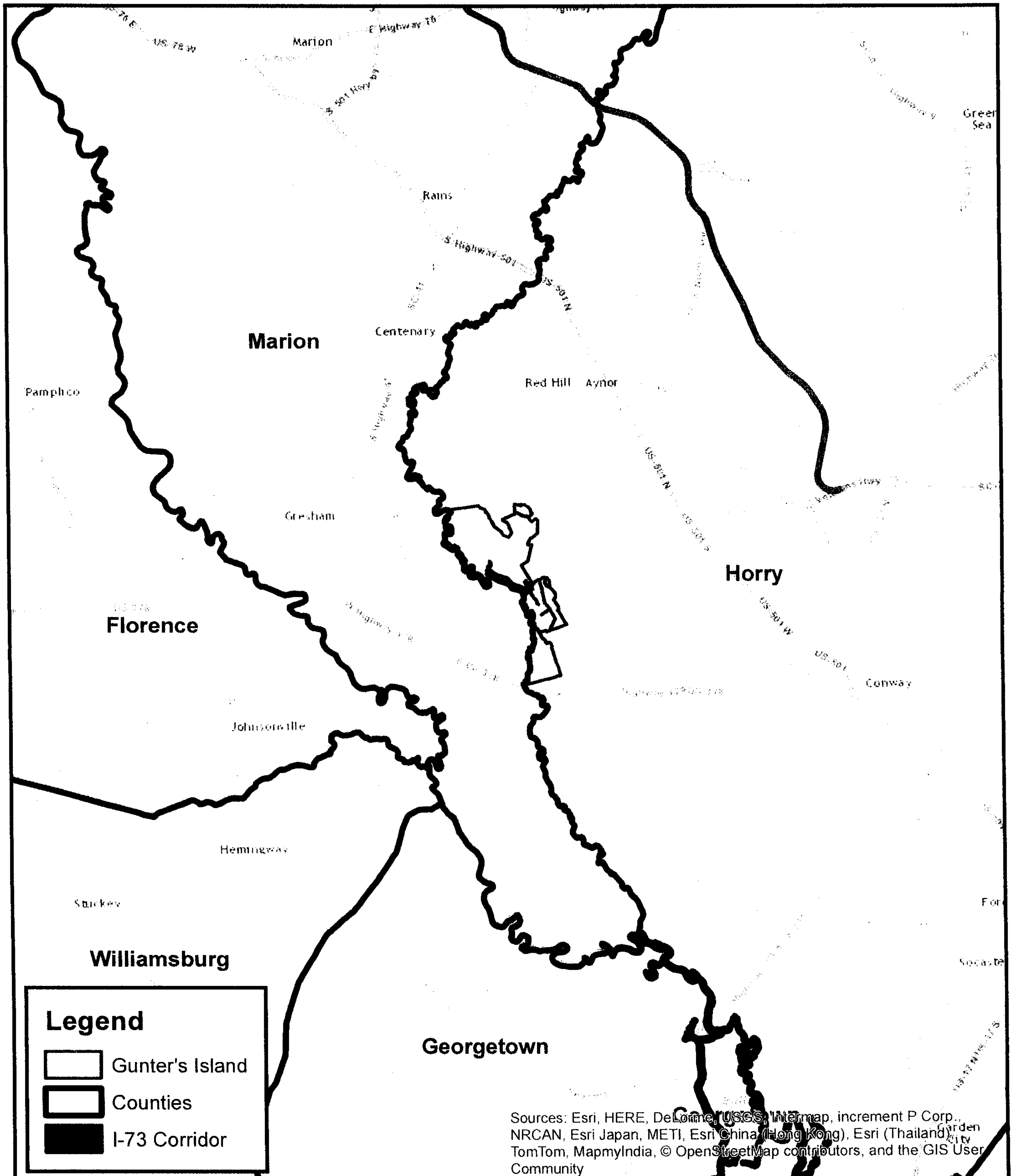
Figure 2:
I-73 Watersheds and EPA Ecoregions

I-73 Compensatory Mitigation Plan
Gunter's Island Tract

Date: January 13,2016

0 2.5 5 10 Miles

N



SCDOT
South Carolina Department of Transportation

Figure 3:
Gunter's Island Tract Location

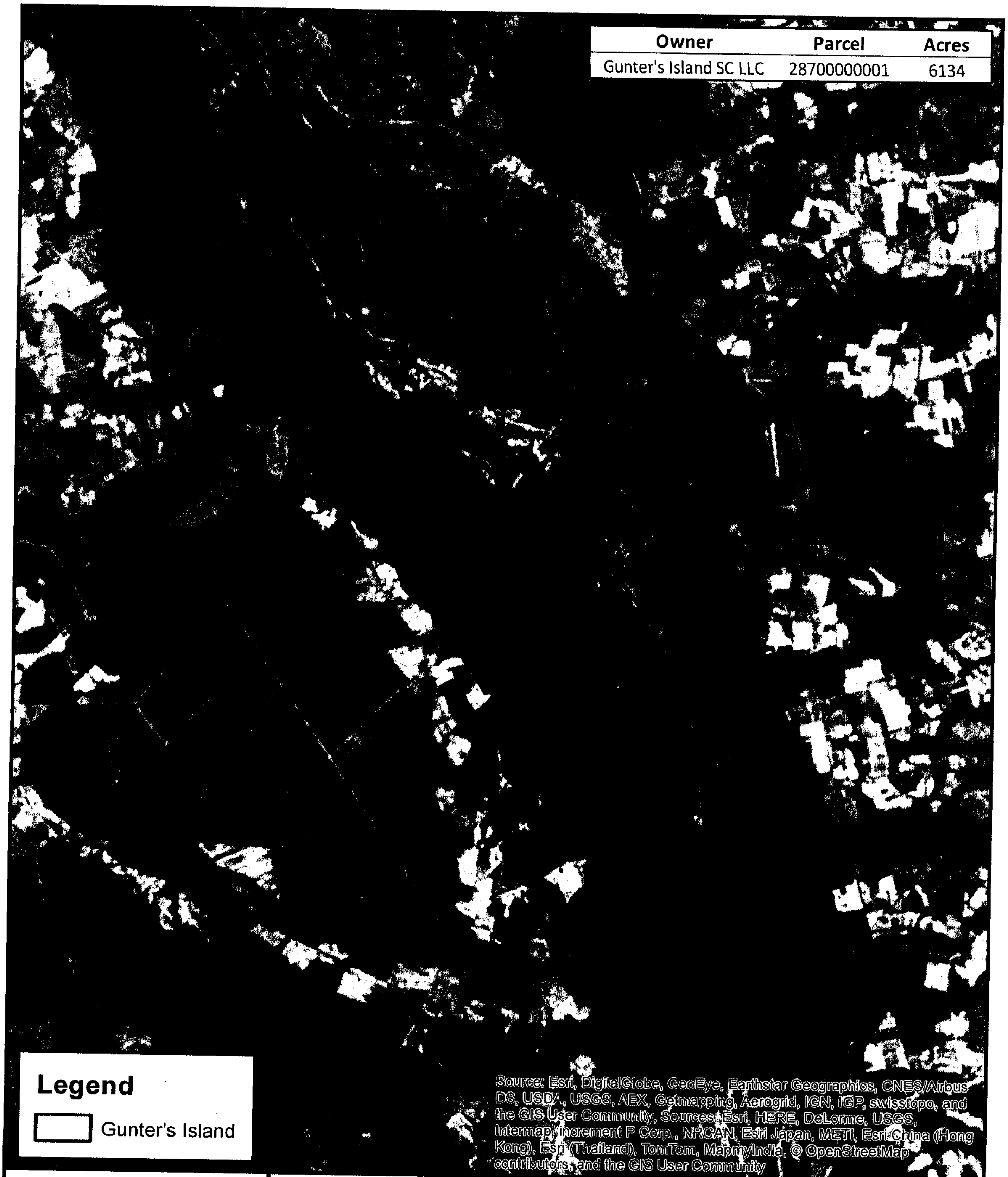
I-73 Compensatory Mitigation Plan
Gunter's Island Tract

Date: April 26, 2016

0 2.5 5 Miles

N

Owner	Parcel	Acres
Gunter's Island SC LLC	28700000001	6134



SCDOT
South Carolina Department of Transportation

Figure 4:
Gunter's Island Tract

I-73 Compensatory Mitigation Plan
Gunter's Island Tract

Date: April 26, 2016

0 0.5 1 Miles

N

Wetland Type	Acres
Palustrine Forested (PFO)	4376.5
Palustrine Scrub-shrub (PSS)	163
Palustrine Emergent (PEM)	1.4
Open Water	42.2
Total	**4540.9**

SCDOT
South Carolina Department of Transportation

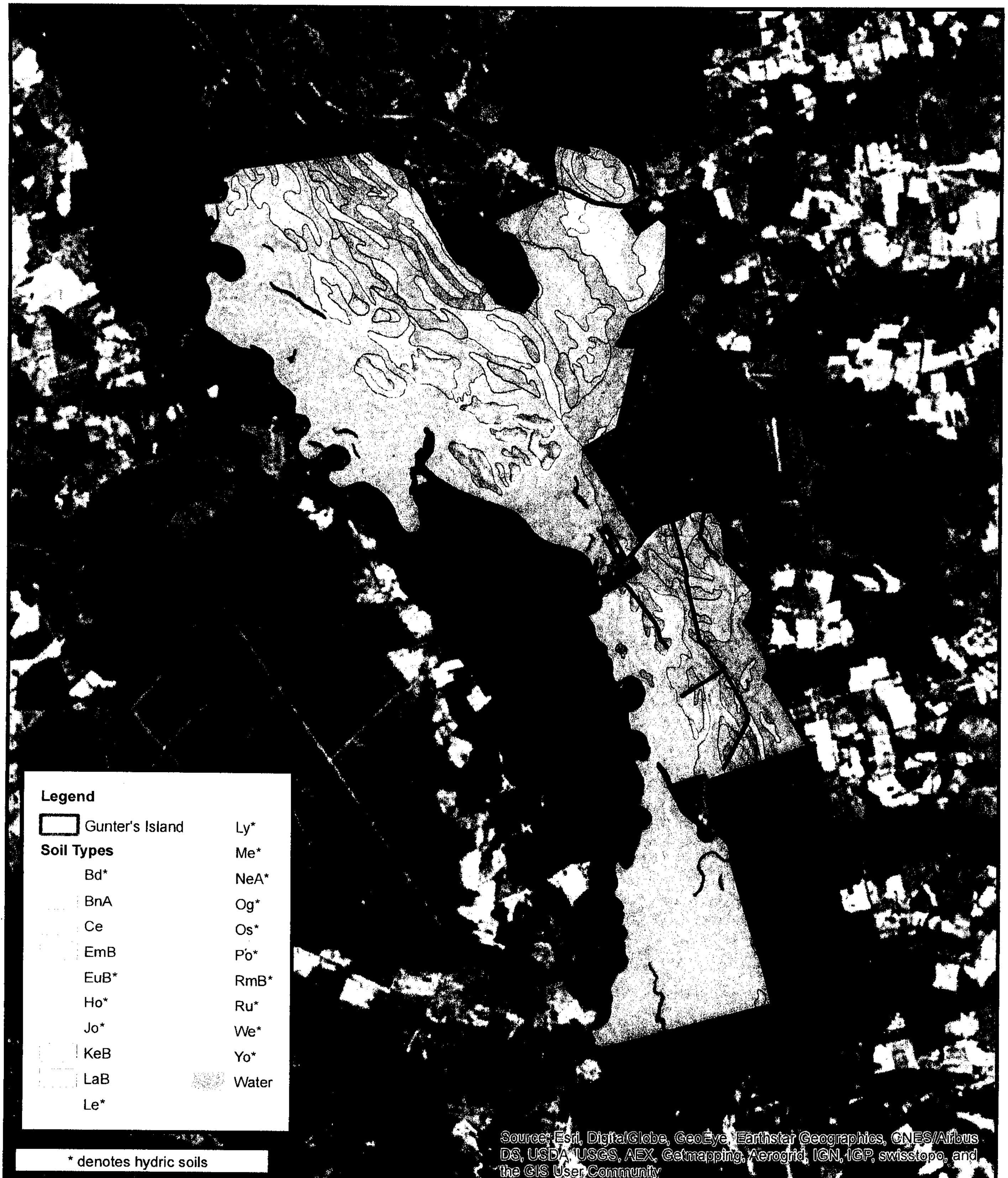
Figure 5:
Gunter's Island NWI Wetlands

I-73 Compensatory Mitigation Plan
Gunter's Island Tract

Date: May 19, 2016

0 0.5 1 Miles

N



South Carolina Department of Transportation

Figure 6:
Gunter's Island Soils

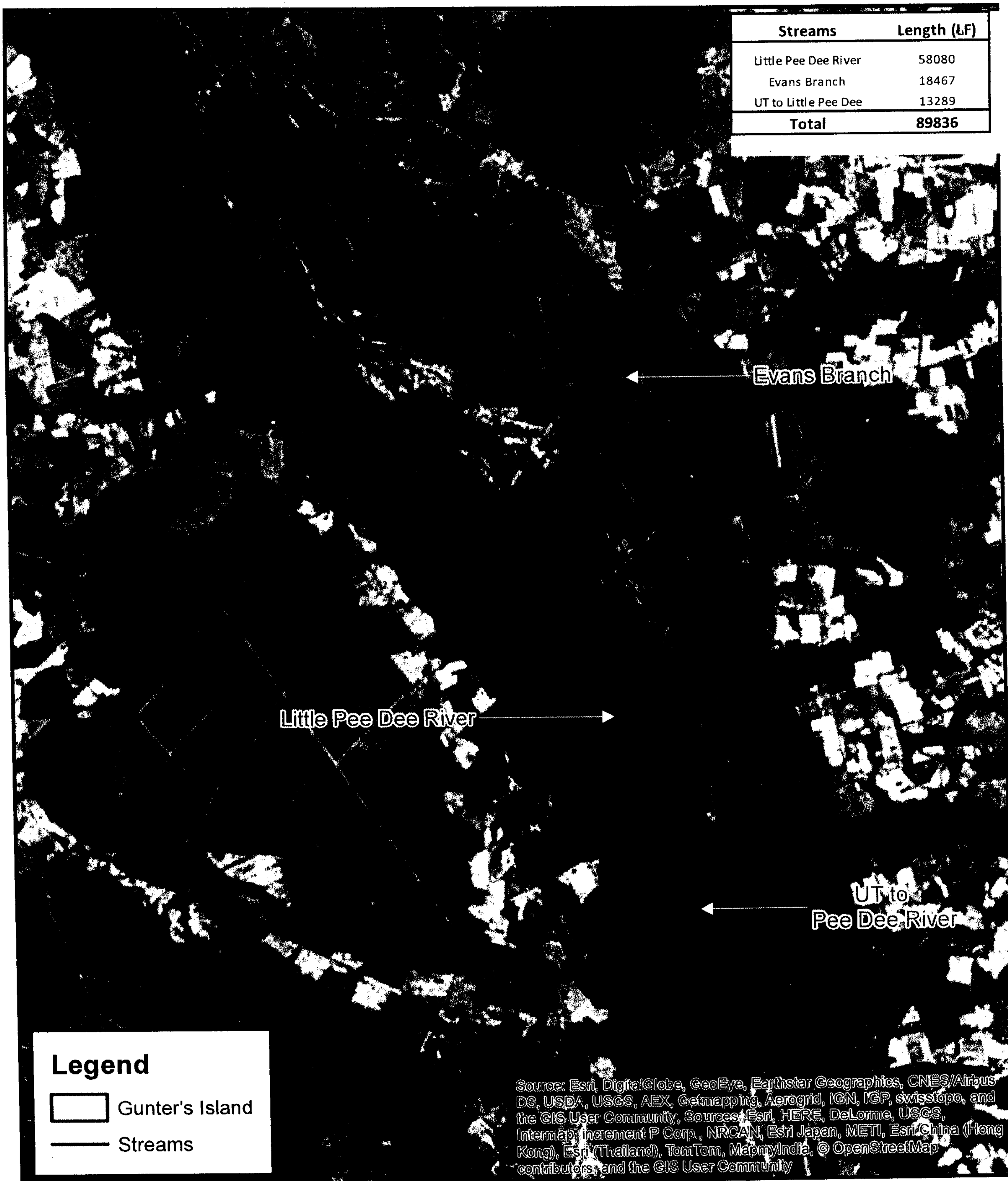
I-73 Compensatory Mitigation Plan
Gunter's Island Tract

Date: April 27, 2016

0 0.5 1 Miles

N

Streams	Length (LF)
Little Pee Dee River	58080
Evans Branch	18467
UT to Little Pee Dee	13289
Total	**89836**



SCDOT
South Carolina Department of Transportation

Figure 7:
Gunter's Island Streams

I-73 Compensatory Mitigation Plan
Gunter's Island Tract

Date: April 27, 2016

0 0.5 1 Miles

N

SCDOT
South Carolina Department of Transportation

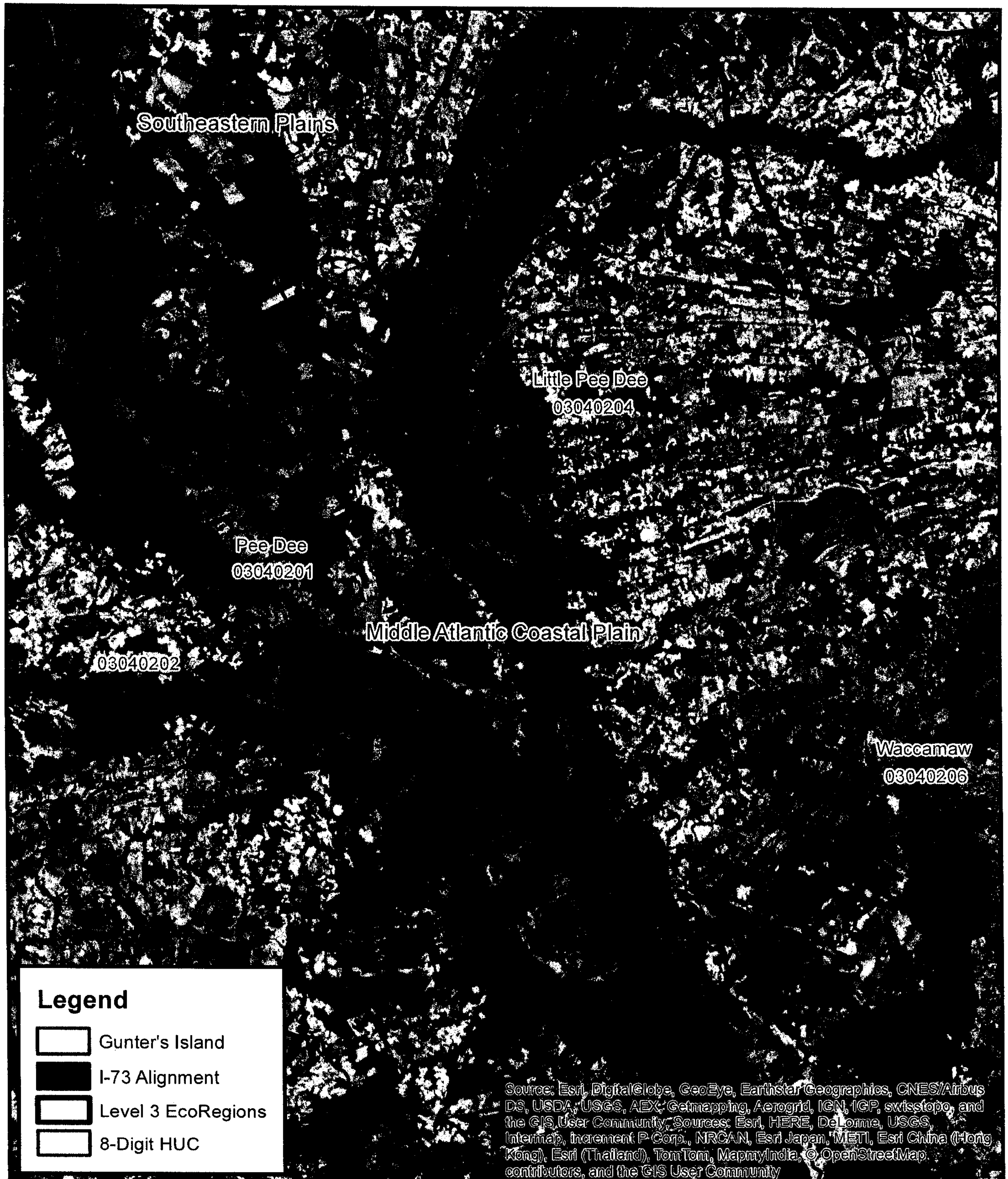
Figure 8:
Gunter's Island
Planted Areas in Hydric Soils

I-73 Compensatory Mitigation Plan
Gunter's Island Tract

Date: April 27, 2016

0 0.5 1 Miles

N



South Carolina Department of Transportation

Figure 9:
Gunter's Island Ecoregion and Watershed

I-73 Compensatory Mitigation Plan
Gunter's Island Tract

Date: April 27, 2016

0 2 4 Miles

N

Discovering the Alcovy River Swamp

and its surrounding habitats

Explore the lush river cane thickets, pawpaw groves, and mysterious swamps of the Alcovy River. Our nature trail is approximately 2 miles in length and takes about an hour and a half to walk at a leisurely pace. As you meander through hardwood forests, tupelo swamps, and old pasture, keep your eyes and ears open for resident wildlife such as fox squirrels, wood ducks, wild turkey, pileated woodpeckers, and bird-voiced treefrogs.

VISITORS MUST CHECK IN

Visitors during regular operating hours (Monday—Friday, 8:00 am—5:00 pm) must check in with the front office upon arrival and departure. Gates close promptly at 5:00 pm. Weekend and after-hour visits must be coordinated through property rental agreements.

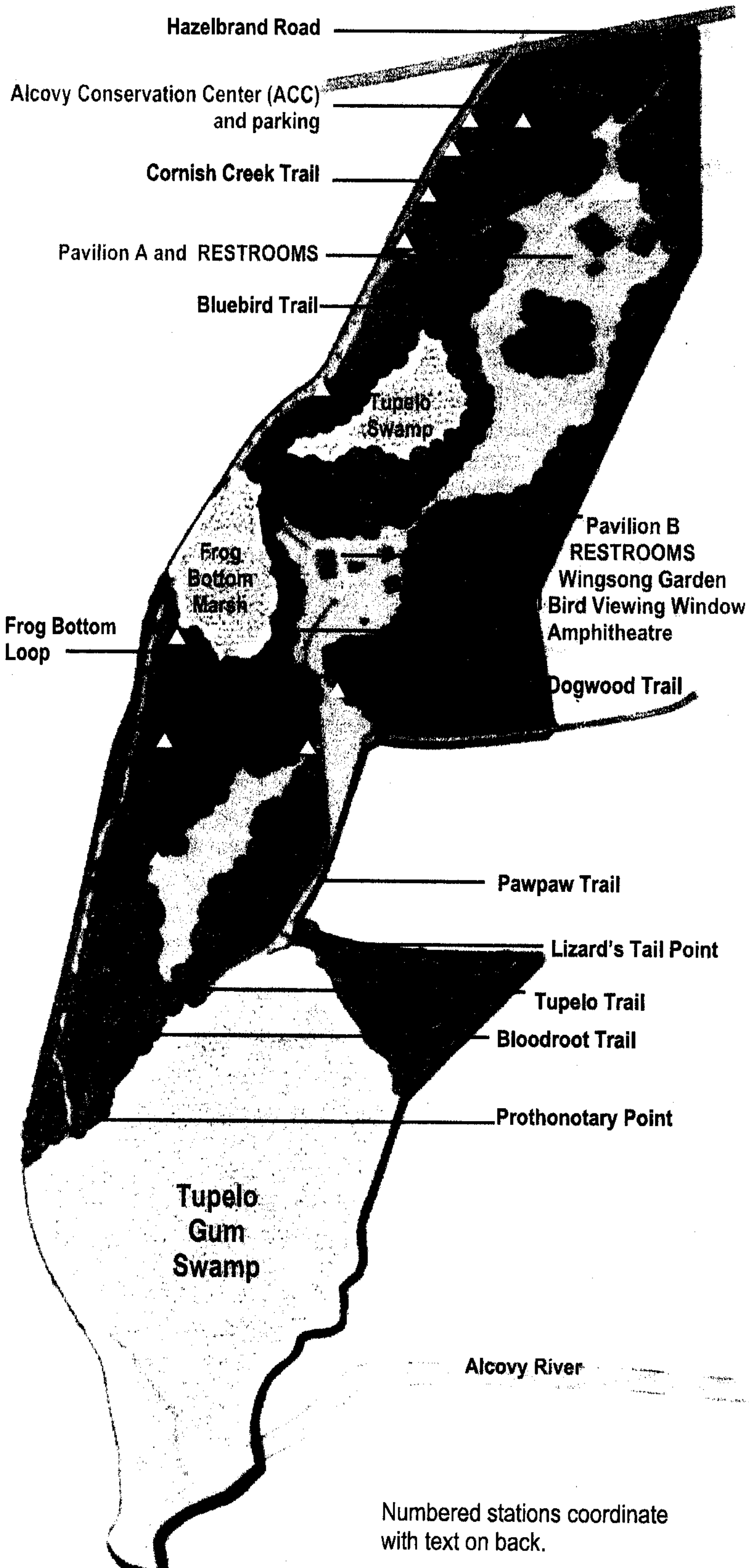
Children under 16 must be accompanied by an adult.

TO HELP YOU ALONG YOUR JOURNEY:

- Numbered stations along the trail coordinate with the interpretative trail guide.
- Yellow arrows and trail signs mark the path.
- "Question & Answer" signs scattered along the trail identify interesting plant life.
- An explorer's backpack containing binoculars, field guides, and other field equipment is available for checkout at the front desk.
- First aid kits are available at the front office.

Please respect the habitat and wildlife by staying on the trails, packing out your trash, and keeping your pet on a leash. Your safety is your responsibility. Please exercise caution and common sense. It is advised that you always hike in the company of others.

ENJOY THE SWAMP!



Georgia Wildlife Federation
11600 Hazelbrand Road, Covington, GA 30014
770-787-7887, Fax: 770-787-9229, www.gwf.org

GWF is a member-supported, not-for-profit (501C-3) conservation organization and the state affiliate of the National Wildlife Federation.

#1 UPLAND HARDWOOD FOREST: Layers of Life
Here in the forest, the plants are arranged in layers. Oaks, hickories, and other large trees form the top layer, or canopy. The mid layer, or understory, is made up of smaller trees such as dogwoods, hawthorns, and hollies. Lower layers include the shrub layer, the herb layer (wildflowers, grasses, and ferns), and the forest floor. Each layer represents a unique ecological niche, with its own particular temperature, humidity, insect populations, and food supplies. Different species nest and forage in different layers—a great system for dividing up the forest's resources.

#2 CORNISH CREEK: Channelization's Lingering Effects
In the 1960s this Alcovy River tributary was channelized to prevent it from flooding its banks. Bulldozers and dredgers scooped out its bottom and removed its natural bends, reducing the once beautiful and complex creek to little more than a drainage ditch. Now, almost forty years have passed, and the creek is still not fully recovered. During storms the water travels too fast. As a result, it erodes the banks and transports large amounts of sediment downstream. High sediment loads reduce water quality and damage aquatic habitats.

#3 RIVER CANE THICKET: Once Common, Now Threatened The only bamboo native to North America, river cane (*Arundinaria gigantea*) was once an extremely common sight along Georgia's rivers and streams. The eighteenth-century American naturalist and writer William Bartram described canebrakes 40 feet high and several miles wide, but most of the canebrakes that remain today are nowhere close to that size. Many of the great cane stands were lost to agricultural development and river control and alteration. Suppression of wildfires has also taken its toll, since the stands require occasional burning to maintain their productivity.

#4 FLOODPLAIN: Keeping Water At Bay
This low, flat area surrounding Cornish Creek is a floodplain. Its function is to hold the overflow of water from the creek during a flood. Did you notice the change in vegetation as you entered this area? Because the land is periodically under water, only the most moisture-tolerant species can survive here. Trees include sweetgum, river birch, and musclewood. In the herb layer, river cane predominates. Notice the piles of sediment around the bases of the trees. This is evidence of past flooding.

#5 POWER LINE: Man and Nature in Cooperation
This power line right-of-way is a wonderful example of the way that people and wildlife can live together. The area is developed, but care has been taken to minimize impact on wild populations. Underneath the power lines the land is maintained as a meadow, full of a rich diversity of berry-, seed-, and nectar-producing plants. These plants provide food, shelter, and nesting spots for wildlife.

#6 WETLANDS: Serving the Environment and Mankind
Not too long ago, wetlands like this one were considered useless, disease-ridden wastelands. Now we understand that wetlands provide many benefits to humans and our environment. They act as water purifiers, filtering out pollutants and sediments. They prevent flooding downstream by providing storage space for excess water flow, performing this task free of charge. They are spawning ground for fish; protective habitat for migratory waterfowl; quiet refuges for human-shy mammals; and home to the wide variety of reptiles, amphibians, and mollusks that need wetlands habitat to survive.

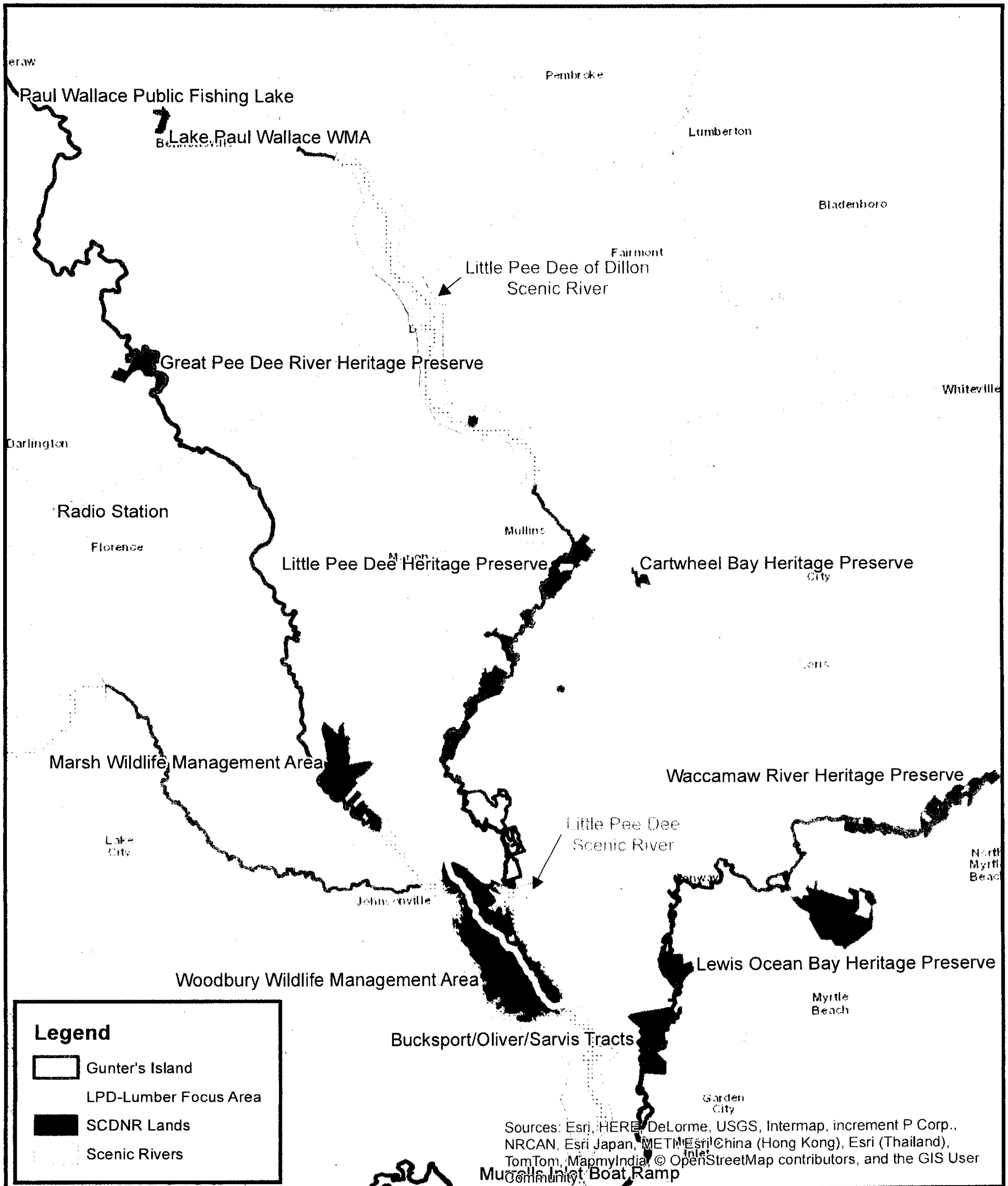
#7 FROG BOTTOM: An Amphibian Oasis This seasonal wetland area provides important breeding opportunities for frogs, salamanders, and other amphibians. Many salamander species spend the majority of their adult lives feeding in the uplands, but in order to mate they must return to the wetlands where they were born. Females lay their eggs on submerged sticks or plant stems. After the eggs have hatched, the larvae spend about 60 days in the water, developing their legs, losing their gills, and gaining their adult colors. Because salamanders spend portions of their life cycles immersed in wetland habitats, the health of their populations can tell us a great deal about the health of our wetlands.

#8 FARM TERRACING: Traces of the Past Fifty years ago this forest was a field and the farmer built terraces (similar to long, wide steps) so that the steep hillside could be farmed. The terraces allowed the farmer to maximize the area available for cultivation. They also prevented soil erosion by slowing the flow of water runoff. Now the forest has reclaimed the field, but traces of the old terraces are still apparent; they remind us of the land's agricultural past.

#9 SUCCESSION: The Battle for Dominance There is a battle going on here. This old field is slowly giving way to a forest. The first year the field was removed from cultivation, sun-loving annual weeds sprang up from seed and took over the bare, exhausted earth. They aerated the soil with their roots and fertilized it with their leaves, and as a result, grasses and other herbaceous perennials were able to get their start—and edge the annuals out. Grasses and wildflowers eventually gave way to shrubs, which then gave way to trees. These trees—mainly sun-loving pines—are dominant now, but they won't remain that way for long. As they mature, an understory of shade-tolerant trees will take root and eventually rise above them.

#10 OLD HEDGEROW: Planted by the Birds
Dense, diverse, and heavily fruiting, this old hedgerow makes an ideal home for songbirds and other wildlife. That's because the hedgerow was *planted* by birds. Season after season they perched on the farmer's fence and casually sowed the seeds of their favorite fruits and berries until eventually the fence all but disappeared amid their plant selections. The resulting hedgerow—a tangle of blackberry, pokeweed, wild grape, and sweetgum—is a mini-ecosystem, complete with all the key ingredients a wild creature needs to survive. It's a plentiful source for berries, nectar, and seeds, and its dense leaves and thorny branches make it a secure spot for hiding, resting, and nesting.

#11 THE EDGE: Where Forest Meets Pasture
Edge is the area where two habitat types meet—in this case, pasture and forest. The edge is a transition zone, and it's one of nature's busiest, most bustling spots. Here you'll find residents of both habitats, along with species specially adapted to live in this in-between zone. Edges allow wildlife to move easily from one habitat type to another to fulfill their needs. This edge area provides hiding places for pasture-dwellers and secure stopovers for forest animals on their way to the pasture for a meal.



SCDOT
South Carolina Department of Transportation

Figure 10:
Little Pee Dee-Lumber Focus Area

I-73 Compensatory Mitigation Plan
Gunter's Island Tract

Date: April 27, 2016

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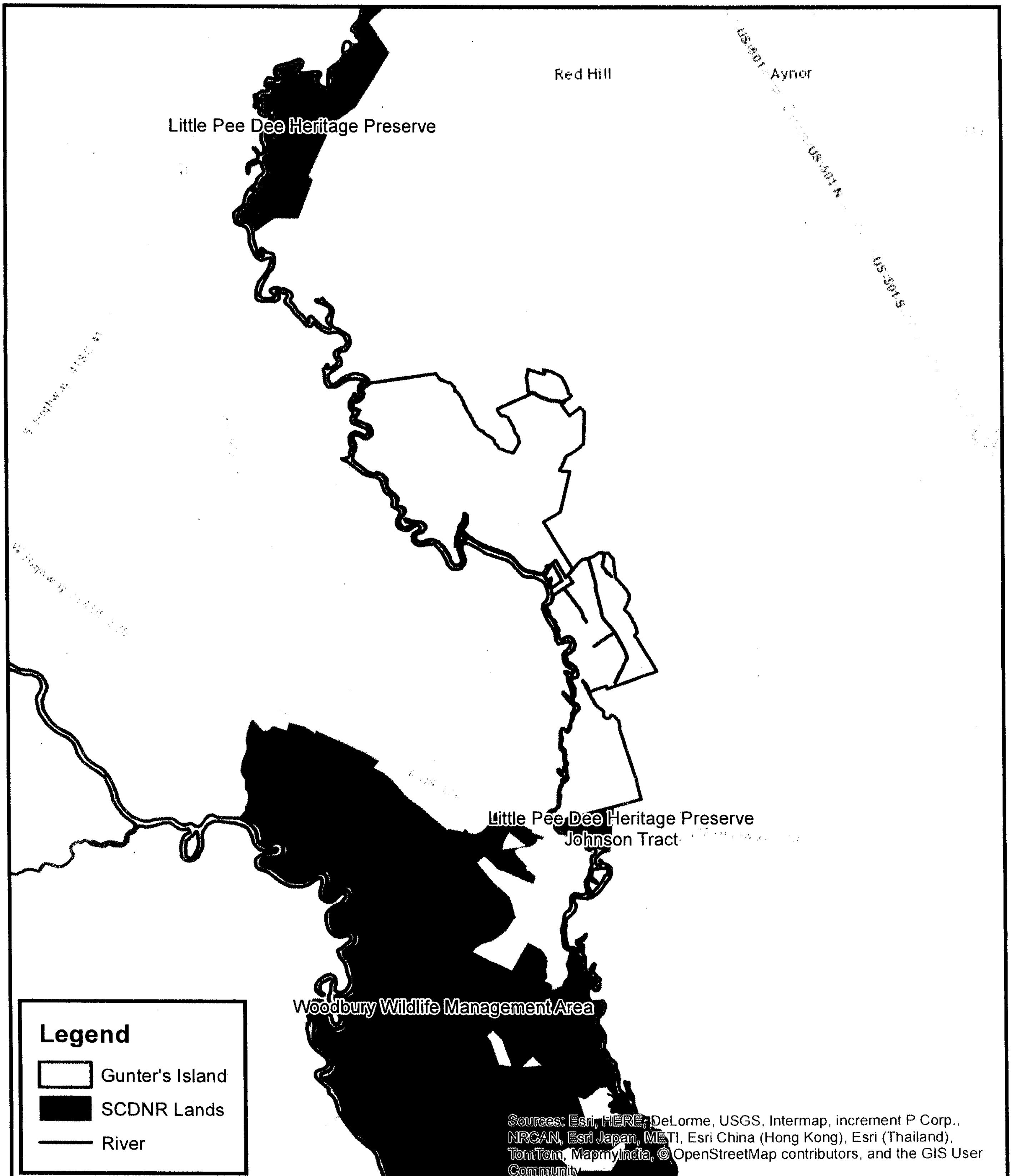

SCDOT
South Carolina Department of Transportation

Figure 11:
Gunter's Island - SCDNR Proximity

I-73 Compensatory Mitigation Plan
Gunter's Island Tract

Date: April 27, 2016

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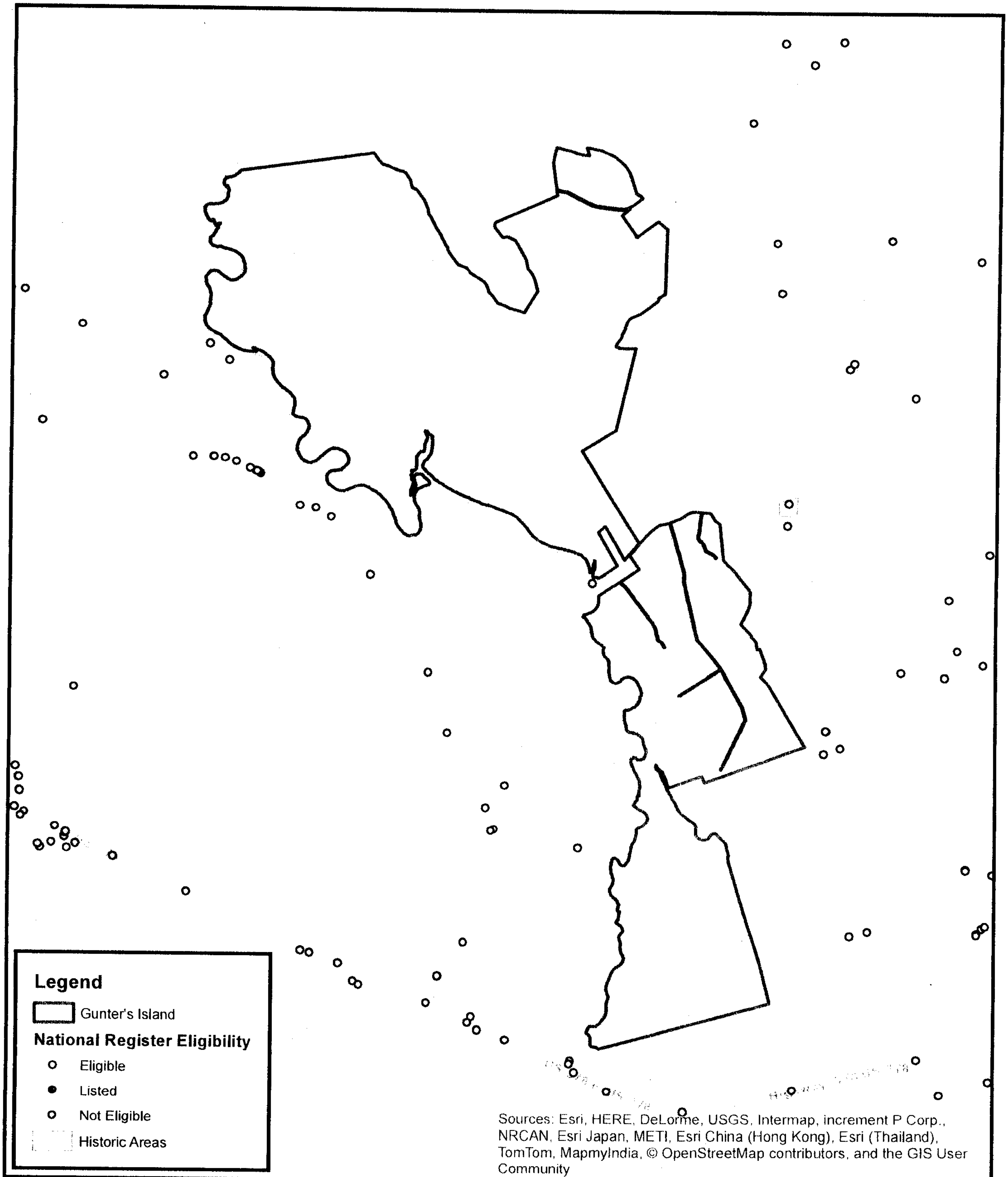
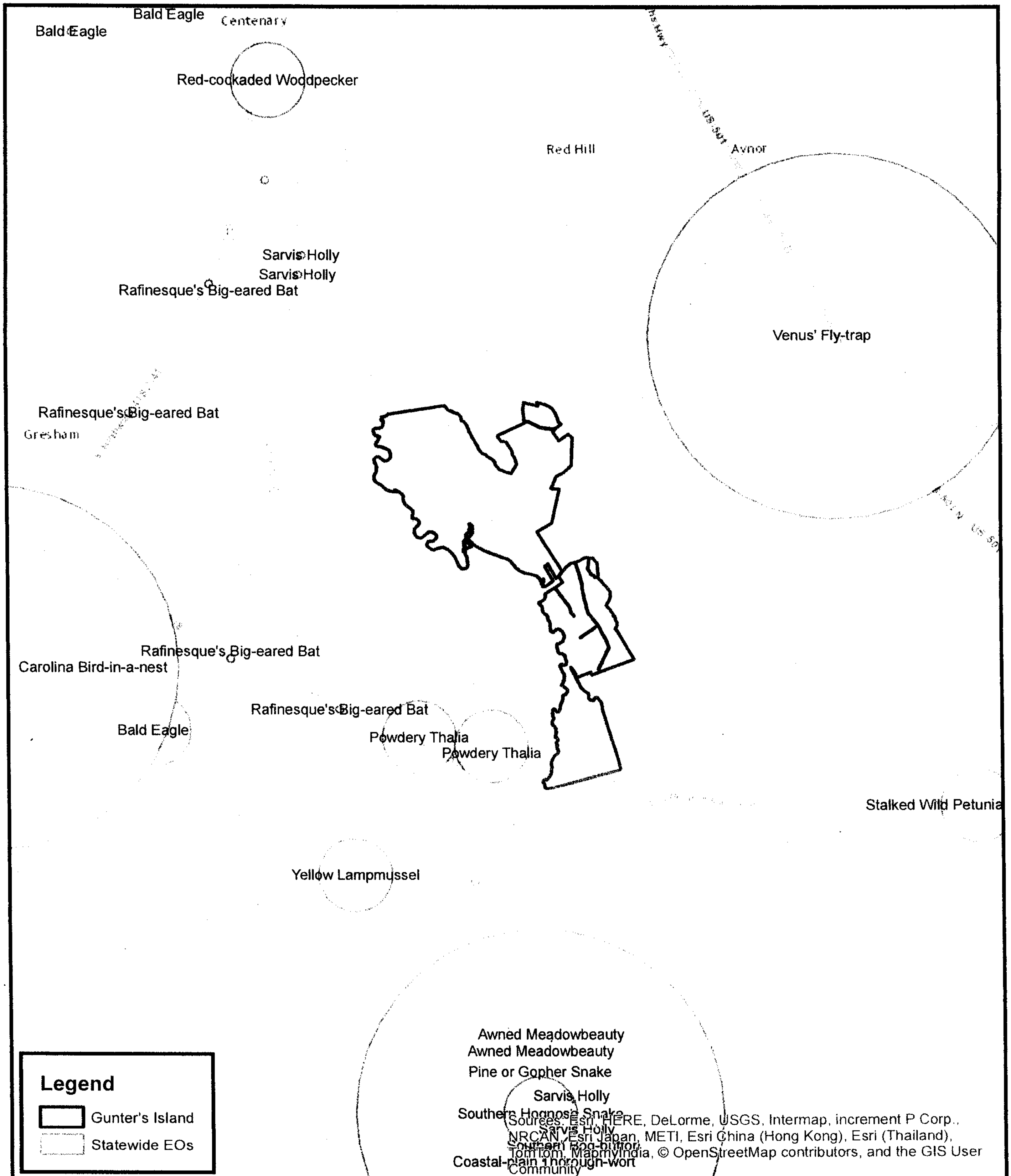


SCDOT South Carolina Department of Transportation

Figure 12:
Gunter's Island - Cultural Resources

I-73 Compensatory Mitigation Plan
Gunter's Island Tract

Date: April 27, 2016



SCDOT
South Carolina Department of Transportation

Figure 12:
Gunter's Island - Wildlife Resources

I-73 Compensatory Mitigation Plan
Gunter's Island Tract

Date: April 27, 2016

0 1 2 Miles

N

Appendices

Appendix A

Photo 1 : Evan's Branch

Photo 2: Emergent Wetland

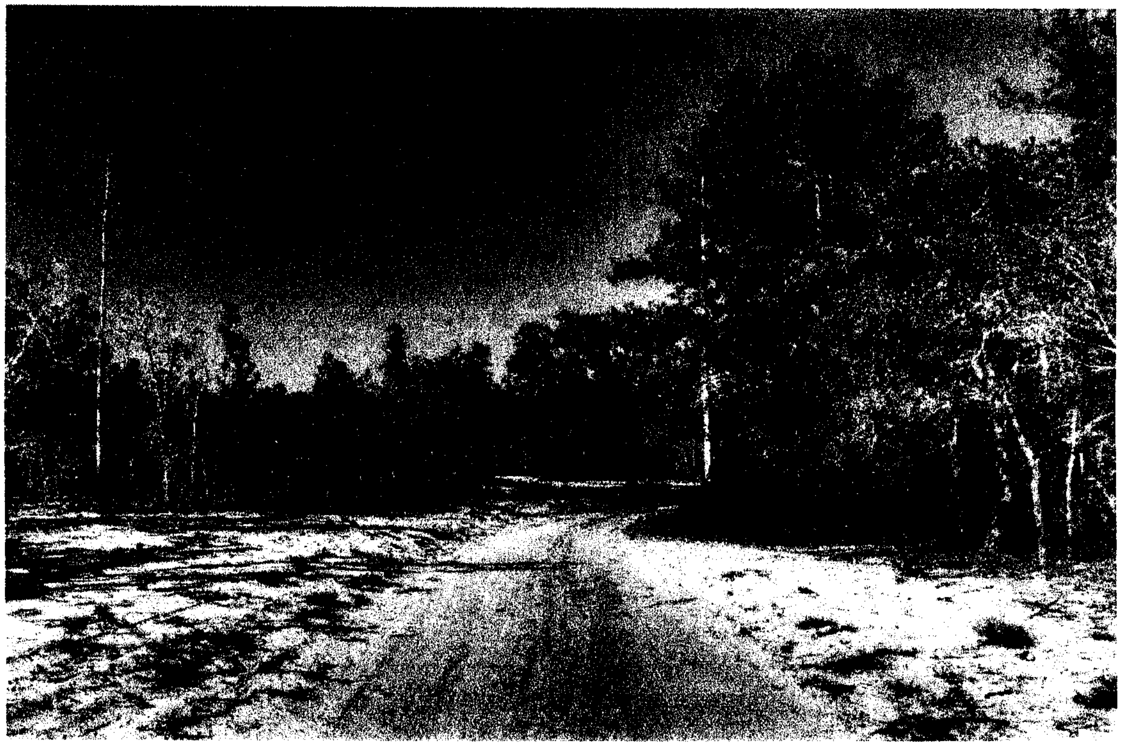


Photo 3: Upland

Photo 4: Little Pee Dee River

Photo 5: Old Growth Cypress Swamp

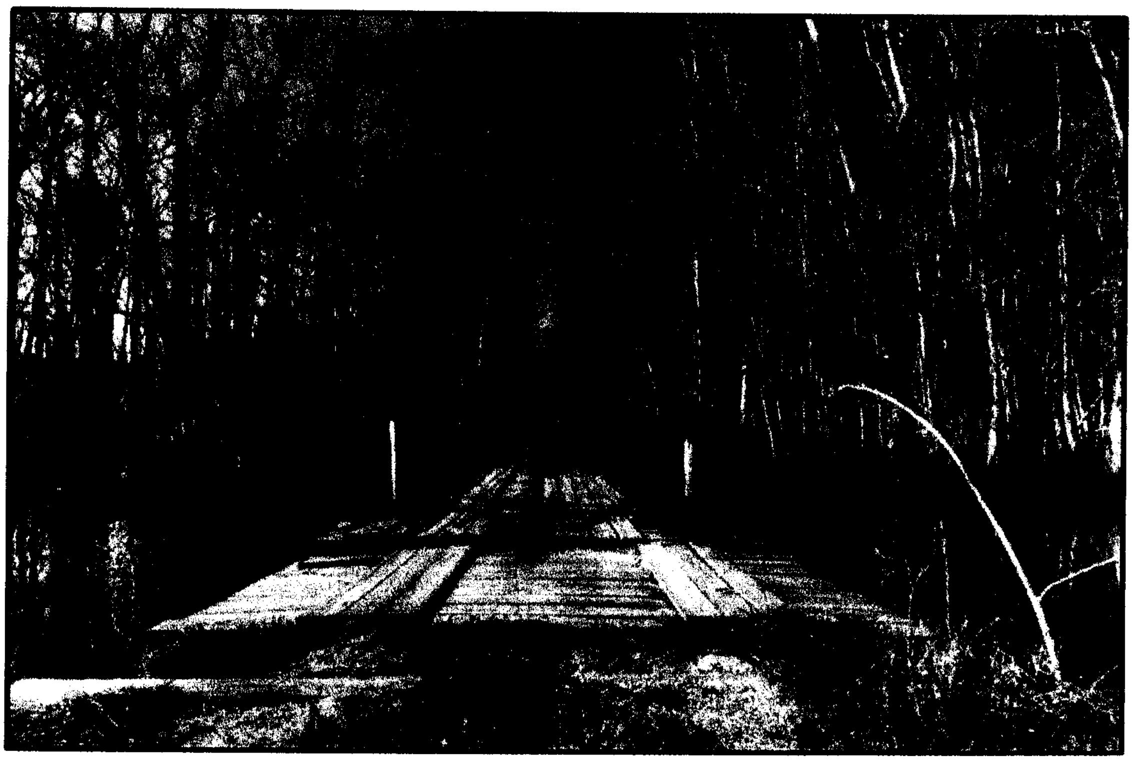


Photo 6: Potential Stream Enhancement

Photo 7: Potential Stream Enhancement

Photo 8: Potential Stream Enhancement

Photo 9: Potential Stream Enhancement

Appendix B

Little Pee Dee-Lumber Focus Area Conservation Plan

South Carolina Department of Natural Resources

March 2016

Little Pee Dee-Lumber Focus Area

Conservation Plan

Prepared by

Lorianne Riggin and Bob Perry[1], and Dr. Scott Howard[2]

March 2016

Acknowledgements

The preparers thank the following South Carolina Department of Natural Resources staff for their special expertise and contributions toward the completion of this report: Heritage Trust data base manager Julie Holling; GIS applications manager Tyler Brown for mapping and listing of protected properties; archeologist Sean Taylor for information on cultural resources; fisheries biologists Kevin Kubach, Jason Marsik, and Robert Stroud for information regarding aquatic resources; hydrologist Andy Wachob for information on hydrologic resources; and wildlife biologists James Fowler, Dean Harrigal, Sam Stokes, Jr. and Amy Tegeler for information regarding wildlife resources.

---

[1] South Carolina Department of Natural Resources, Office of Environmental Programs.

[2] South Carolina Department of Natural Resources, Geological Survey.

Little Pee Dee-Lumber Focus Area Conservation Plan

The goal of this conservation plan is to provide science-based guidance for future decisions to protect natural resource, riparian corridors and traditional landscape uses such as fish and wildlife management, hunting, fishing, agriculture and forestry. Such planning is valuable in the context of protecting Waters of the United States in accordance with the Clean Water Act particularly when the interests of economic development and protection of natural and cultural resources collide. Such planning is vital in the absence of specific watershed planning. As additional information is gathered by the focus area partners, and as further landscape-scale conservation goals are achieved, this plan will be updated accordingly.

This document is available at http:www.dnr.sc.gov/

Little Pee Dee-Lumber Task Force Partners[3]

Ducks Unlimited

Natural Resources Conservation Service

Pee Dee Land Trust

Private Landowners

South Carolina Department of Natural Resources

The Nature Conservancy

United State Fish & Wildlife Service

Wildlife Action, Inc.

Winyah Rivers Foundation, Inc.

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[3] These conservation partners are listed as potential since the Little Pee Dee-Lumber Focus Area Task Force has not been formalized and does not yet meet as an active task force; however these potential task force partners are aware of and/or work actively on other focus area task force efforts in other areas of the state. The potential task force partners have reviewed this document and support its conclusions as noted in Appendix VII.

Table of Contents

1. Introduction

The Little Pee Dee, Lumber, Lynches, Black, Waccamaw and the Great Pee Dee rivers together form the Pee Dee River basin, the largest river basin in the state with 7,860 square miles or 25.3% of South Carolina's land area including 14 counties (Chesterfield, Clarendon, Darlington, Dillon, Florence, Georgetown, Horry, Kershaw, Lancaster, Lee, Marlboro, Marion, Sumter and Williamsburg). Beginning in the southeastern plains of North Carolina, the Little Pee Dee River flows approximately 74 miles through the Pee Dee-Southeastern Plains ecobasin before entering the Pee Dee Coastal plain ecobasin of South Carolina where the Little Pee Dee flows for 65 more miles receiving input from the Lumber River, before merging with the Great Pee Dee River.

The Little Pee Dee-Lumber Focus Area begins in the most southeastern corner of Dillon County following the Lumber River to the confluence of the Little Pee Dee River down to US Highway 378 encompassing the blackwater system down the county line between Marion and Horry counties.

The Little Pee Dee-Lumber focus area boundaries are defined from the North Carolina-South Carolina state line surrounding the Little Pee Dee River southwest down US Highway 15 to the Town of McColl to the intersection of SC Highway 381, thence south to the Town of Clio to the intersection of SC Highway 9 south, thence southeast along Dunbar Highway to the intersection of SC Highway 38, then southeast to the intersection of SC Highway 917, thence to the second intersection with SC Highway 41, thence south on Highway 41 past Mullins to the intersection of US Highway 378, then east on US Highway 378 to SC Highway 49 to the end of Woodberry Road. The southern edge is defined from the end of Woodberry Road east across the Little Pee Dee and picks up along Gilbert Road to begin the eastern border at US Highway 701, thence north to the North Carolina-South Carolina state line and following the line back northwest to US Highway 15 at the Town of McColl (Appendix 1).

Protected lands in the Little Pee Dee-Lumber Basin include the Cartwheel Bay Heritage Preserve (591 acres), Little Pee Dee Heritage Preserve/Wildlife Management Area (10,406 acres), Woodbury Wildlife Management Area (25,924 acres). Additionally, the Little Pee Dee-Lumber Focus Area contains numerous private properties protected under conservation easements (7,857).

2. Recognized Conservation Plans

In 1990, the South Carolina General Assembly designated 14 miles of the Little Pee Dee River from US Highway 378 to the confluence with the Great Pee Dee River as a State Scenic River. An additional 64 miles extending upstream from US Highway 378 were determined eligible for scenic river status in 1997 but have not yet been formally designated. The upper portion of the Little Pee Dee, a 46-mile segment in Dillon County from Parish Mill Bridge on County Road 363 (County Line Road) near the Marlboro County line southeasterly to the crossing of Allen Bridge Road near Marion County line, was designated as a State Scenic River in 2005. The South Carolina Department of Natural Resources (SCDNR) described and mapped this portion of the river to develop the Little Pee Dee Scenic River Trail.

The SCDNR Heritage Trust Program identified the Little Pee Dee River corridor as a high priority area for conservation, and as such, approximately 10,000 acres of the Little Pee Dee Heritage Preserve extends roughly 17 miles of the Little Pee Dee and Lumber rivers. Protected river corridors provide a travel byway for wildlife, filtration system for pollutants and sediments and habitat for the endangered Sarvis holly (*Ilex amelanchier*). The natural communities of concern include cypress-gum swamps, bottomland hardwood forests and fluvial sand ridge communities.

The Little Pee Dee Basin is home to important migrating, wintering and breeding waterfowl habitat, shore and wading bird habitat, as well as habitat critical to neotropical migrant songbirds and a diverse group of bottomland forest bird species. Because of its importance to a broad group of bird species, the Little Pee Dee-Lumber Basin Focus Area is a step-down project under the umbrella of a number of national and regional conservation initiatives to include the North American Waterfowl Management Plan (NAWMP) and its Atlantic Coast Joint Venture (ACJV), the North American Bird Conservation Initiative, Partners in Flight (PIF), the United States Shorebird Conservation Plan (USSCP) and the National Bobwhite Conservation Initiative (NBCI).

The NAWMP was initiated in 1985 in response to plummeting numbers of migratory waterfowl across the continent. The central premise of the NAWMP is protection and enhancement of existing nesting, migrating and wintering waterfowl habitat. The ACJV is the implementation program of NAWMP in the Atlantic states.

PIF was launched in 1990 in response to growing concerns about declines in the populations of many land bird species that were not covered under other conservation initiatives, particularly neotropical migrant species. The focus of PIF is to combine, coordinate and increase resources in order to achieve the highest order of success in bird and habitat conservation in the Northern Hemisphere. The USSCP was originated in the mid-1990s and its goals were formalized in 2000 in order to provide a scientific framework to determine species, sites and habitats that most urgently need conservation action. The NBCI is the unified strategic effort of 25 state fish and wildlife agencies and various conservation organizations to restore wild populations of bobwhite quail in this country to levels comparable to 1980 through restoration and maintenance of native grassland habitats to the benefit of a diverse assemblage of grassland dependent species.

The forested wetlands provide important nesting and migration habitat for a large assemblage of passerines. SCDNR documented breeding of 15 species of neotropical migratory songbirds and 35 species of other land birds on the Little Pee Dee River Heritage Preserve. These areas also provide nesting and foraging habitat for bald eagles, swallow-tailed kites and wood storks. Several wading bird rookeries also occur in the vicinity of the Little Pee Dee River.

3. Threats

The abundant, unique and diverse resources of the Little Pee Dee-Lumber Focus Area are under threat from a variety of contemporary land use practices and changes including development, agriculture, sand mining, and other conversions of land to non-traditional uses and poor land use practices. Continued development along the US 378 and US 501 corridors typifies the types of land use changes that threaten fish and wildlife populations and water quality within the Basin. These land use changes and practices impact aquatic habitats by increasing silt and sediment loads, introducing excessive nutrients and chemical contaminants, altering water availability due to irrigation and instream habitat due to sand mining.

2015 Aerial photography from USDA National Agriculture Imagery Program of Dillon County and the Little Pee Dee River.

A notable threat to the Little Pee Dee-Lumber Focus Area includes the development of the Interstate-73 (I-73) corridor, which will impact and take an estimated 30 acres of the Little Pee Dee Heritage Preserve known as the Vaughn Tract at the crossing of the Little Pee Dee River parallel to SC Highway 917 south of Mullins. Although this will impact the area near the heritage preserve directly, this chosen route will reduce the overall amount of floodplain encroachment and wetland impacts of the overall I-73 project. Large scale road development can cause an array of problems including an increase in various pollution types, such as litter and runoff, and habitat fragmentation.

Habitat fragmentation negatively impacts wildlife population viability by reducing the amount or quality of available habitat, removing native vegetation and increasing opportunities for invasive species to become established. Fragmented habitats may not be large enough nor adequately connected to support species that need more territory in which to reproduce, rear young, forage for food resources and store healthy body reserves. The loss and fragmentation of habitat make it difficult for migratory species to utilize places to rest and feed along their migration routes. Smaller and disjoint patches of habitat support more tenuous populations of wildlife increasing their vulnerabilities to disease and predation. Habitat fragmentation along with urbanization also renders it difficult to continue traditional habitat management efforts such maintenance of fire-based ecosystems due to concerns over smoke management. Along with reducing habitat fragmentation, the importance of maintaining riparian corridors and wetland buffers for aquatic organisms and herpetofauna also is critical. Negative impacts to riparian corridors and wetland buffers can degrade aquatic communities and decrease diversity with an increase in sedimentation and contaminated runoff from nearby urban areas. Efforts clearly are needed in the Little Pee Dee Basin to support and maintain large, well-connected corridors of specialized habitat needed for threatened and endangered species and those that are rare or of conservation concern.

The management of whole ecosystems represents an ideal in conservation that is often impractical or difficult to achieve. However, the Little Pee Dee-Lumber Basin Focus Area presents a unique opportunity to enhance landscape-scale conservation. The Basin contains the Little Pee Dee Heritage Preserve and is immediately upstream of the Winyah Bay Focus Area. The focus area concept encourages conservation of private land through voluntary conservation easements. The addition of privately owned conservation areas, particularly those adjacent to or in close proximity to larger or ecologically sensitive areas, serves to protect and enhance the existing outstanding natural, cultural and recreational resources of the Little Pee Dee-Lumber Focus Area.

4. Objectives

The initial objective is to establish a network of partners comprised of private landowners, conservation organizations, land trusts and government agencies to oversee and maintain a landscape scale conservation initiative to protect and enhance the important lands, waters, rare and sensitive habitats, cultural sites and diverse natural resources of the Little Pee Dee-Lumber Basin while maintaining in perpetuity, the long-honored traditional uses of hunting, fishing, forest management and agriculture.

Since large public ownership within the Little Pee Dee-Lumber River focus area is limited through scarce agency funding and governmental appropriations, the partnership aims to primarily work with willing private landowners to promote stewardship using a variety of tools ranging from technical and financial assistance to conservation easements. The key for this initiative is to encourage the continuation of private ownership while ensuring long-term protection and enhancement of resource stewardship. Currently there are 36,921 acres of state protected property in the Little Pee Dee-Lumber River Basin and 7,856 acres of private land conservation which comprise approximately 4% of the entire focus area (estimated acreage 161,226) (Table 1).

The overarching objectives of the Little Pee Dee–Lumber River Focus Area Project are to protect and enhance important lands, waters, rare and sensitive habitats, cultural sites and diverse natural resources of the midlands while maintaining in perpetuity, for the benefit of Palmetto State citizens, the long-honored traditional uses of hunting, fishing, forest management and agriculture.

Table 1. Protected Lands in the Little Pee Dee-Lumber Focus Area.*

State		**Property Manager**
Cartwheel Bay Heritage Preserve	591	S.C. Department of Natural Resources
Little Pee Dee Heritage Preserve	10,406	S.C. Department of Natural Resources
Woodbury Wildlife Management Area	25,924	S.C. Department of Natural Resources
Private		**Private Landowners**
Pee Dee Land Trust	3,169	
The Nature Conservancy	2,890	
U.S. Natural Resources Conservation Service	1,797	
Total Protected Lands in Acres	**44,777**	

**November 2015 GIS data*

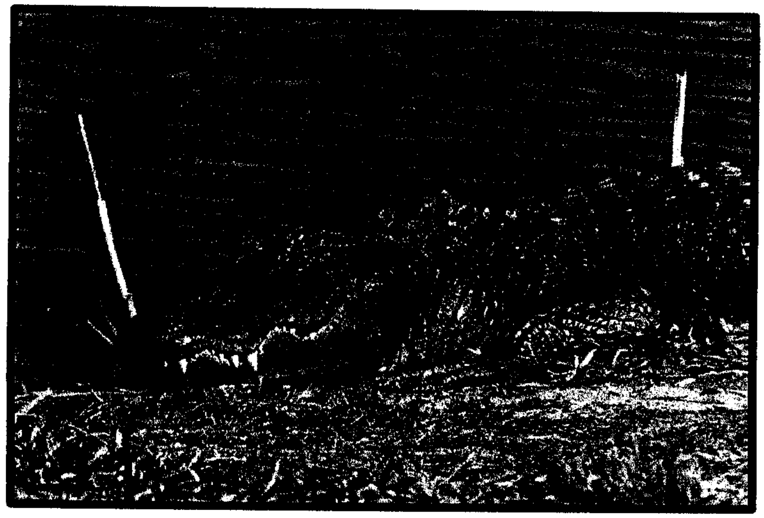
5. Natural Resources

The Little Pee Dee and Lumber rivers are bounded by classic blackwater river floodplain forest with canopies of bald cypress (*Taxodium distichum)*, swamp tupelo (*Nyssa biflora*) and red maple (*Acer rubrum*). Other species commonly associated include tulip poplar (*Liriodendron tulipfera*), sweet gum (*Liquidambar styraciflua)*, pond pine (*Pinus serotina)*, loblolly pine (*Pinus taeda)* and laurel oak (*Quercus laurifolia)*. Floodplain forests are seasonally inundated by the river and represent the most deeply flooded of all southeastern United States forest types. The shrub layer in areas subjected to frequent flooding is open, whereas areas with infrequent flooding may be fairly dense and pocosin-like.

Banded water snake

Bottomland hardwood forests of the Little Pee Dee and Lumber rivers typically occur between the floodplain forest and drier upland sites. Unlike floodplain forests and longleaf pine (*Pinus palustris*) uplands, bottomland hardwoods are quite diverse in terms of the number of overstory species. This ecotype is dominated by a well-developed canopy of water oak (*Quercus nigra*), overcup oak (*Q. lyrata*), willow oak (*Q. phellos*), sweetgum, water hickory (*Carya aquatica*) and loblolly pine. Bottomland hardwood forests are inundated regularly by the river, but do not typically contain standing water for extended periods of time. The drier conditions result in a better developed herbaceous layer. Loose spangle grass (*Uniola laxa*) often develops thick stands in open areas. Some of the most significant resources are the geomorphic features, the oxbow lakes, sloughs, braided streams, sand ridges and other fluvial formations that have been created by the river within the floodplain. These type features are not unusual on Coastal Plain blackwater rivers; however, the Little Pee Dee and Lumber rivers have an unusually numerous and well developed array of fluvial formations. Many of these features can be directly accessed from the main river channel. Oxbow lakes are often associated with floodplain forests. Oxbow lakes are former sections of river channel that became isolated when the river changed course. There are several excellent examples of oxbow lakes along the Little Pee Dee River. Xeric, elevated sand ridges run parallel to the rivers throughout the floodplain. This ecosystem is associated with fluvial sand deposited by river currents. The soils are sandy and well drained. Longleaf (*Pinus palustris*) and sparse loblolly pines dominate the canopy. The mid-story consists primarily of turkey oak (*Quercus laevis*), sand live oak (*Q. virginiana* var. *germinata*) and persimmon (*Diospyros virginiana*). Common understory plants include wiregrass (*Aristida stricta*), dropseed (*Sporobolus* spp.), and prickly-pear (*Opuntia compressa*). The protection of these ridges is essential to the health of the overall aquatic system.

Isolated wetlands are also important habitats for a variety of species. Not only do they serve as potential water sources for wildlife, but they are also a critical habitat component for a number of reptile and amphibian species. Some of the most imperiled herpetological species rely on isolated ephemeral wetlands for breeding, timing their reproduction to coincide with the filling of the ponds that provide fish-free environments for tadpoles and larvae to mature. Amphibians, an important component to overall biodiversity, serve as indicator species for water quality due to their reliance on water for portions of their life cycle. Healthy and diverse populations of amphibians are indicative of high quality habitat both terrestrial and aquatic. Isolated wetlands, especially those that are ephemeral or seasonally wet, are often overlooked as an integral landscape feature worthy of protection. However, these areas are essential to maintain amphibian biodiversity and ecosystem function.

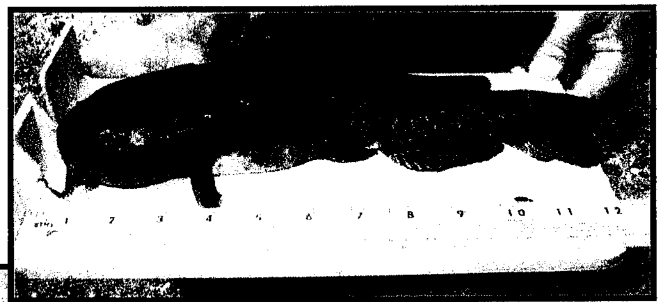

American Alligator

When exploring the splendor of these blackwater river systems, visitors may encounter river otters (*Lontra canadensis*); beavers (*Castor canadensis*); American alligators (*Alligator mississippiensis*); rat snakes (*Elaphe [Pantherophis] obsoleta*); banded (*Nerodia fasciata*), brown (*N. taxispilota*) and red-bellied (*N. erythrogaster*) water snakes; Florida (*Pseudemys floridana*) and river (*P. concinna*) cooters; wood ducks (*Aix sponsa*); mink (*Neovison vison*); raccoons (*Procyon lotor*); gray foxes (*Urocyon littoralis*) and the elusive bobcat (*Lynx rufus*).

Looking to the sky following the towering trees, some of which are 80-100 years old, visitors may catch a glimpse and at the least hear the sounds of yellow-billed cuckoos (*Coccyzus americanus*), prothonotary warblers (*Protonotaria citrea*), Acadian flycatchers (*Empidonax virescens*), northern parulas (*Setophaga americana*); red (*Vireo olivaceus*) and white eyed vireos (*V. griseus*), bald eagles (*Haliaeetus leucocephalus*), swallow tailed kites (*Elanoides forficatus*) and wood storks (*Mycteria americana*). White-tailed deer (*Odocoileus virginianus*), wild turkey (*Meleagris gallopavo*) and bobwhite quail (*Colinus virginianus*) are frequent inhabitants along the floodplain with the occasional black bear (*Ursus americanus*) making its appearance as it travels the river corridor. Venturing out after dark, one could spot several bat species including the Seminole bats (*Lasiurus seminolus*), Southeastern myotis (*Myotis austroriparius*), big brown bats (*Eptesicus fuscus*) and Eastern pipistrelles (*Perimyotis subflavus*) in search of moths and mosquitoes. The Little Pee Dee and Lumber river drainages contain several species of state or regional concern. Rare plant species include Sarvis holly (*Ilex amelanchier*), Well's pixie moss (*Pyxidanthera barbulata* var. *barbulata*), riverbank quillwort (*Isoetes riparia*) and Pickering's morning-glory (*Stylisma pickeringii* var. *pickeringii*). Other rare species that may occur in these habitats are listed in Appendix 2 from the SCDNR State Wildlife Action Plan.

6. Aquatic Resources

The Little Pee Dee River meanders through a flat broad flood plain composed largely of forests and swamplands, interspersed with farms and pastures. Adjacent land use is predominately forestry and agriculture. Population centers nearby are Marion and Mullins in Marion County to the west, and Conway in Horry County to the east. Florence, approximately 35 miles west of the river, is the major market center in the Pee Dee area.

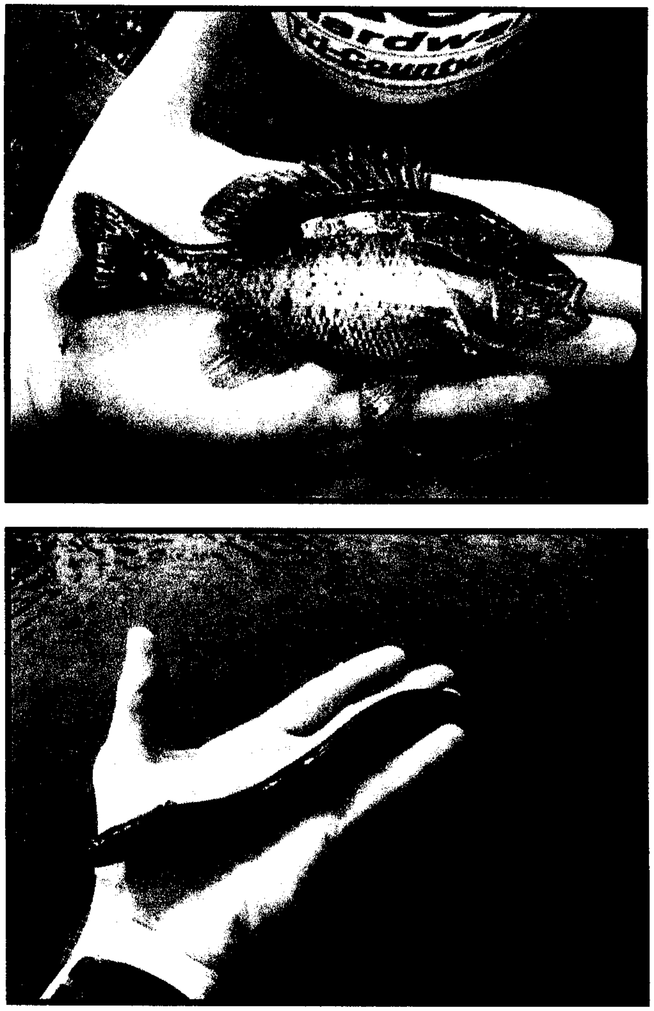


Top right: Flat bullhead; Bottom left: Blackbanded sunfish;

South Carolina's waterways contain 137 native fish species and 22 introduced species, 12 of which are sport fish in large impoundments. The Pee Dee River drainage contains 8,075 miles of stream, 15,984 acres of lake area, 102 native fish species and 10 introduced fish species. The Pee Dee drainage supports among the highest species diversity on the Atlantic slope, relative to other drainages.

SCDNR Freshwater Fisheries staff sampled the Little Pee Dee River by electrofishing in the Spring (April-June) and Fall (October-November) of 2011, from Floydale Landing (34.33405, -79.32427) on the Little Pee Dee River downstream to Punch Bowl Landing (33.75683, -79.21903) just above the confluence of the Great Pee Dee River. Prior to this study, the site had not been sampled by SCDNR since 1993. A total of 3,375 fish representing 15 families and 39 species were collected from the entire study area during spring 2011. Bluegill (*Lepomis macrochirus*), coastal shiner (*Notropis petersoni*) and spotted sunfish (*L. punctatus*) were the most abundant species accounting for 15.7%, 15.4%, and 8% of the total number of fish sampled, respectively. The percent contribution by weight showed that bowfin (*Amia calva*) account for 34.6% of the biomass sampled followed by longnose gar (*Lepisosteus osseus*) at 11.75% and flathead catfish (*Pylodictes olivaris*) *at* 8%. Redbreast sunfish (*L. auritus*) accounted for a mere 4.92 % of the species composition during the 2011 Spring sample. Ictalurid species collected during spring 2011 accounted for 1.57% of the total species composition by number, and only included blue catfish (*Ictalurus furcatus*), channel catfish (*I. punctatus*), flathead catfish and yellow bullhead (*Ameiurus natalis*).

In the Fall of 2011, 3,678 fish were collected representing 14 families and 33 species. The most abundant species were coastal shiner (33.3%), redbreast sunfish (15.6%), brook silverside (*Labidesthes sicculus*) (11.2%), largemouth bass (*Mircopterus salmoides*) (6.5%) and bluegill (6.3%). However, the top five species by biomass included bowfin (28.1%), flathead catfish (28.0%), largemouth bass (9.7%), channel catfish (5.7%) and longnose gar (4.7%). Results show that bowfins and flathead catfish comprise the majority of biomass in the Little Pee Dee system.



Top: Redbreast sunfish; Bottom: American eel

Compared to the 1990-1993 study, the 2011 study demonstrated that relative abundance of most centrachid (sunfish) species declined, while cyprinid (carp and minnow) species increased. It is also worth noting the complete absence of native bullhead species (brown [*A. nebulosus*], flat [*A. platycephalus*] and snail [*A. brunneus*]), madtoms (tadpole [*Notorus gyrinus*] and margined [*N. insignus*]) and the white catfish (*A. catus*); all of which were present in the 1990-1993 study (Appendix 3). Two flathead catfish were collected in the 1990-1993 study, while 63 were collected in the 2011 studies. As the flathead catfish became more established in the system they preyed upon and outcompeted these smaller ictalurids (catfish). The white catfish, snail bullhead and flat bulhead are all listed as Conservation Priority Species in the SCDNR Wildlife Action Plan. Recent studies including the South Carolina Stream Assessment also documented American eel (*Anguilla rostrata*) and banded sunfish (*Enneacanthus obesus*) within the focus area, both of which are also priority species in the SCDNR Wildlife Action Plan. The absence of major dams and other barriers on the Pee Dee River system in South Carolina provides critical connectivity for migratory fishes including American eel. Data from the SCSA show that the Little Pee Dee Focus Area supports among the highest densities of American eels in South Carolina.

The Southeastern United States sustains the greatest diversity in freshwater crayfish and mussels, approximately 375 and 300 species respectively, in the world. Crayfish serve as a keystone species in the aquatic community as an important prey items and scavengers, whereas mussels function not only as a prey base, but also as a facilitator to improve water quality by filtering large volumes of water to reduce excessive quantities of algae, nutrients, bacteria and organic material. There are 37 native mussel species in South Carolina, 24 of which are listed as priority conservation species.

The variation in aquatic habitats from the main river to tributaries, sloughs, oxbow lakes and swamps provides a high diversity of aquatic life.

7. Hydrologic Resources

The Little Pee Dee and Lumber rivers are encompassed in the Little Pee Dee River Sub-basin as a part of the South Carolina State Water Assessment produced by SCDNR. This Sub-basin area includes Dillon, Marion, Horry and Marlboro counties, totaling approximately 1,100 square miles and 3.5% of the state's land area. Headwaters for the major rivers within the Sub-basin, the Little Pee Dee and Lumber, originate in the Sandhills ecoregion of North Carolina. Several small to moderately sized tributary streams also drain the Sub-basin including Buck, Bear and Lake swamps. Typical of many Coastal Plain streams, extensive swamplands are associated with much of the main stem and tributary streams, resulting in meandering and often poorly-defined stream channels.

Data from the two gaging stations on the Little Pee Dee River suggest variable and potentially limited surface water availability. Flows are dependent predominantly on rainfall and direct runoff with lower streamflows partially supplemented by base flow from ground-water storage. Average flow of the Little Pee Dee River is almost 600 cubic feet per second (cfs) near Dillon and more than 3,000 cfs at Galivants Ferry. The lowest flows of record were 24 cfs near Dillon in 1954 and 73 cfs at Galivants Ferry in 2002. The flood flow of record occurred in 1964 at Galivants Ferry (27,600 cfs) due to runoff from tropical storm Hilda that produced localized flooding. Streamflow in the Little Pee Dee River is fairly reliable; however, surface-water storage would be needed to ensure adequate water supplies during periodic low-flow conditions. Surface-water development in the Little Pee Dee River subbasin is not extensive. Pages Mill Pond, near Lake View in Dillon County, is the largest body of water, with a surface area of 200 acres and a volume of 640 acre-ft. The aggregate surface area of all lakes of 10 acres or more is 1,310 acres, and the total volume is about 4,300 acre-ft.

The waters of the Little Pee Dee Sub-basin provide water suitable for aquatic life, recreation, drinking water, fishing, industry and agriculture and are designated by the South Carolina Department of Health and Environmental Control (SCDHEC) as "Freshwater." Portions of the Little Pee Dee River and Cedar Creek boast the SCDHEC designation of an "Outstanding Resource Water," meaning these freshwater streams constitute outstanding recreational or ecological resources and are suitable as a drinking-water source with minimal treatment. As a part of SCDHEC's Watershed Water-Quality Assessment program, 29 surface-water sites were sampled in the Little Pee Dee River Sub-basin in 2003 in order to assess suitability for aquatic life and recreational use. Aquatic-life uses were fully supported at 21 sites, or 72% of the water bodies sampled in this Sub-basin; most of the impaired water exhibited dissolved oxygen levels below the concentrations needed to support aquatic life. Recreational use was fully supported in 78% of the sampled water bodies; the water bodies that did not support recreational use exhibited high levels of fecal-coliform bacteria (Table 2).

Table 2. Water quality impairments in the Little Pee Dee River Sub-basin from the SCDNR State Water Assessment.

Water Body Name	Station Number	Use	Status	Water Quality Indicator
Bear Swamp	PD-368	Aquatic Life	Nonsupporting	Dissolved oxygen
Little Pee Dee River	PD-365	Aquatic Life	Nonsupporting	pH
Buck Swamp	PD-031	Recreation	Partially supporting	Fecal coliform
	PD-029E	Recreation	Partially supporting	Fecal coliform
Little Pee Dee River	PD-030A	Aquatic Life	Nonsupporting	Dissolved oxygen
		Recreation	Partially supporting	Fecal coliform
	PD-348	Aquatic Life	Nonsupporting	pH
	PD-052	Aquatic Life	Partially supporting	Copper
Maple Swamp	PD-030	Recreation	Partially supporting	Fecal coliform
Loosing Swamp	RS-03513	Aquatic Life	Nonsupporting	Dissolved oxygen
Chinners Swamp	PD-352	Recreation	Partially supporting	Fecal coliform
White Oak Creek	PD-037	Aquatic Life	Partially supporting	Dissolved oxygen
		Recreation	Partially supporting	Fecal coliform
Little Pee Dee River	PD042	Aquatic Life	Nonsupporting	Dissolved oxygen and pH

According to SCDHEC's online Watershed Atlas tool, there are 20 NDPES permits and five approved TMDLs within the boundaries of the Little Pee Dee-Lumber Focus Area (Table 3). The five TMDLs, all due to fecal coliform, are located at the Little Pee Dee River at S-17-23, at Maple Swamp at SC Highway 57, at the Little Pee Dee River below the junction with Maple Swamp, at White Oak Creek at S-34-31 and at Chinners Swamp at Gunters Island Road off S-26-99 all due to fecal coliform. SCDHEC has assigned fish consumption advisories on the Little Pee Dee and Lumber Rivers due to high mercury levels. There should be no consumption of blue catfish, flathead catfish, bowfin, chain pickerel (*Esox niger*) or largemouth bass in the Little Pee Dee from the NC-SC State Line to its confluence with the Great Pee Dee River and all other fish species should only be eaten once a week. On the Lumber River from the NC-SC State Line to the confluence with the Little Pee Dee, bowfin, channel catfish, flathead catfish or largemouth bass should not be eaten. Chain pickerel and redear sunfish should be eaten only once a week and bluegill once a month from the Lumber River. For more detail on the sites listed as a part of SCDHEC's Watershed-Water Quality Assessment, visit http://gis.dhec.sc.gov/watersheds/

Table 3. NPDES permits within the Little Pee Dee-Lumber Focus Area boundaries.

Permit #	Type	Name
SC0021776	Municipal	Dillon/Little Pee Dee
SC0022284	Municipal	Lake View Wastewater Treatment Facility
SC0025348	Municipal	GSW&SA/Loris Wastewater Treatment Facility
SC0025402	Municipal	Town of Latta
SC0029408	Municipal	Mullins/White Oak Creek Wastewater Treatment Facility
SC0031801	Domestic	South of the Border Motel
SC0041963	Municipal	McColl Waste Water Treatment Facility
SCG250256	Industrial	Baldor Electric Company
SCG570006	Municipal	GSW&SA/Town of Nichols
SCG646037	Industrial	Trico/Tanner Water Treatment Plant
SCG646038	Municipal	Trico/Bobby Byrd Water Treatment Plant
SCG646045	Municipal	Trico/Hamer Water Treatment Plant
SCG646056	Industrial	Trico Water Company Fairfield Plant
SCG646075	Municipal	Bucksport Water System Pauley Swamp
SCG731136	Industrial	GSWSA/Highway 917 Pit Mine
SCG730635	Industrial	Superior Sand/Black Creek Mine
SCG731235	Industrial	Inland Sand Mine
ND0080721	Domestic	Locust Tree Development
SCG730043	Industrial	Carolina Sand/Britton's Neck
SCG731082	Industrial	D&L/Pee Dee Crossroads Mine

The Little Pee Dee River Sub-basin is entirely in the Coastal Plain. The northwestern part of the Sub-basin obtains much of its ground-water supply from the Middendorf and Black Creek aquifers. The Black Creek is used almost exclusively as the ground-water source for large-capacity wells. In the upper reach of the Sub-basin, both aquifers are used, and the water of both is of good quality. Ground-water levels are continuously monitored by SCDNR in six wells within the Little Pee Dee River Sub-basin, in Dillon County located in Little Pee Dee State Park. Although there are no known site-specific water-level problems in this Sub-basin, years of pumping from wells in this Sub-basin and in neighboring Sub-basins have resulted in a regional lowering of water levels in the Black Creek Aquifer throughout the southern half of the Sub-basin.

Water use in the Little Pee Dee River Sub-basin is summarized in Table 4. Offstream water use totaled 2,487 million gallons in 2006, ranking it fourteenth among the 15 Sub-basins. Groundwater sources contributed to 98% of water used with the remaining from surface water. Water-supply use accounted for almost 95 % of the total water use, followed by industry (3%), golf course use (2%), and irrigation (1%). Consumptive use in this Sub-basin is estimated to be 349 million gallons, or approximately 14% of the total offstream use.

Table 4. Reported water use in the Little Pee Dee River Sub-basin for the year 2006 from the SCDNR State Water Assessment.

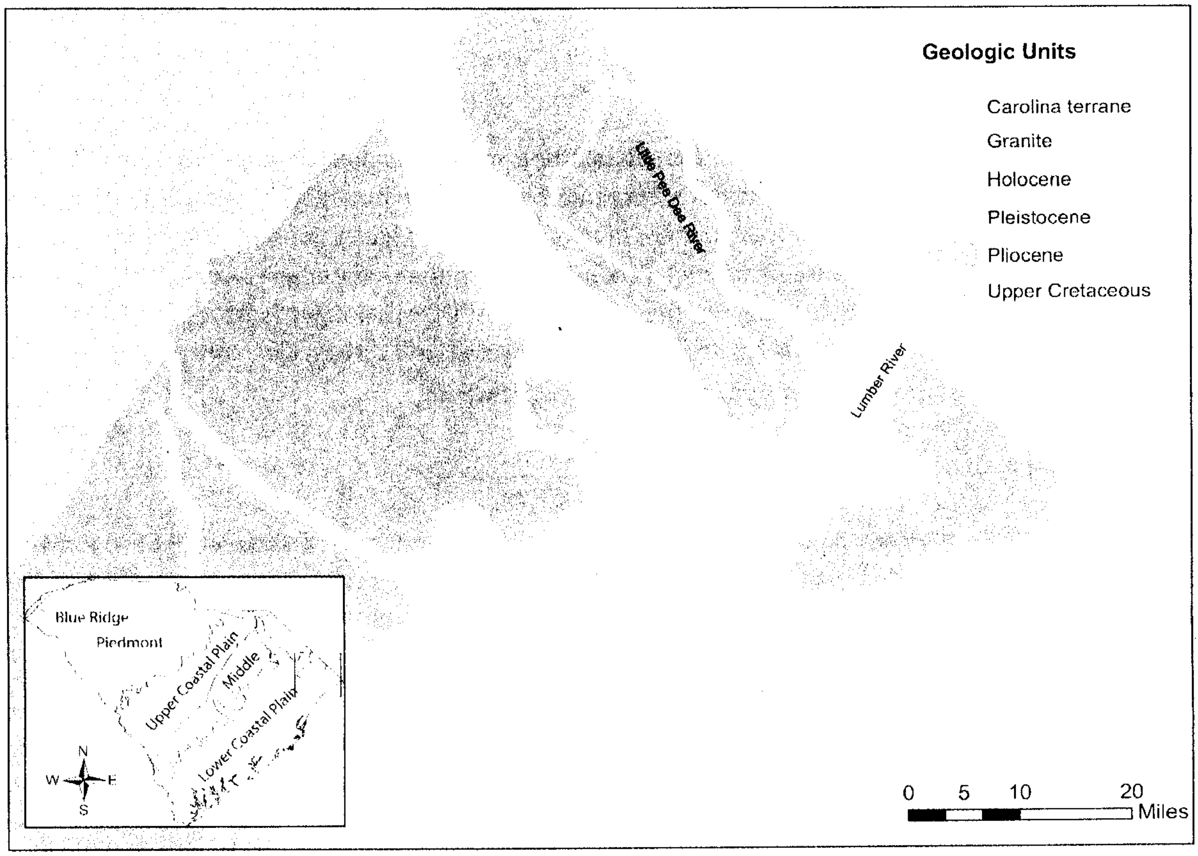
	Surface Water		Ground Water		Total Water	
Water-use Category	**Million gallons**	**% of total surface water use**	**Million gallons**	**% of total ground water use**	**Million gallons**	**% of total water use**
Aquaculture	0	0	0	0	0	0
Golf Course	37	75.1	0	0	37	1.5
Industry	0	0	69	2.8	69	2.8
Irrigation	12	24.9	16	0.7	29	1.2
Mining	0	0	0	0	0	0
Other	0	0	0	0	0	0
Thermoelectric Power	0	0	0	0	0	0
Water Supply	0	0	2,352	96.5	2,352	94.6
Total	49		2,437		2,487	

8. Geologic Resources

8.1 Basin location

The Little Pee Dee-Lumber Basin covers 252 square miles and is located east of Florence and north-northwest of Myrtle Beach. The Basin is almost entirely in the Lower Coastal Plain (Figure 1). Some of the higher elevations reach into the Middle Coastal Plain. These coastal plain areas trend roughly parallel to the modern coastline (southwest to northeast), and the Little Pee Dee-Lumber Basin also trends nearly parallel to the coastline.

Figure 1: Regional geologic map covering the Little Pee Dee-Lumber basin. Unit colors: Pliocene (purple), Pleistocene (pink), recent (yellow).



8.2 Topographic Relief

The Middle and Lower Coastal Plain are both geologically young, less than 5 million years old. Therefore, the surficial sediments are not heavily dissected by erosion except directly adjacent to the rivers. A majority of the topographic features result from earlier depositional processes, such as fluvial and coastal sediment transport or later shoreline erosion during sea-level rise.

8.3 Fluvial Systems

Both the Little Pee Dee and Lumber rivers have head waters in the Coastal Plain. Because the rivers flow slowly through forested swamps and wetlands, they generate tannin compounds from decaying plant material. The tannins impart a dark color to the water, hence the name blackwater rivers. These rivers originate on the south flank of the Cape Fear Arch, a bulge in the upper crust extending from the coast to the northwest along the Cape Fear River in North Carolina. The arch has slowly tilted the area downward to the south-southwest, which is the general direction of river flow, and fairly symmetrical valleys are formed with bluffs on both sides and wide floodplains. At the south end of the basin, near the confluence with the Great Pee Dee River, the Great Pee Dee River floodplain and its sediments dominate the western portion of the Little Pee Dee River.

8.4 Younger Features

On level surfaces of Middle and Lower Coastal Plain, there are several much younger features. The first are Carolina Bays. These are elliptical features recognizable on aerial photographs and LiDAR. They tend to be elongated northwest to southeast and are more common on Middle Coastal Plain surfaces. Many Carolina Bays pond water because of clayey layers just beneath the surface, and because of this effect they have been drained for agriculture or other development. Other younger features are Eolian sand sheets and dunes in area of Britton Neck. These produce a rippled land surface with very poor agricultural value owing to the very well-drained soils and low organic content.

8.5 Geology

The Lower Coastal Plain consists of Pleistocene and younger sediments at the surface that are less than 2.6 million years. The Middle Coastal Plain consists of Pliocene sediment at the surface 5.3-2.6 million years old. No detailed geological mapping (e.g. 1:24,000-scale) is available for the basin. There are several regional-scale maps (1:250,000-scale) that were published in the 1970s and 1980s, but advances in geological knowledge since then have brought the interpretation of those maps into question.

8.6 Scarps

The entire Pee Dee-Lumber basin is below 200 feet above mean sea level. The Surry Scarp at 90 feet above mean sea level separates the Middle and Lower Coastal Plain.

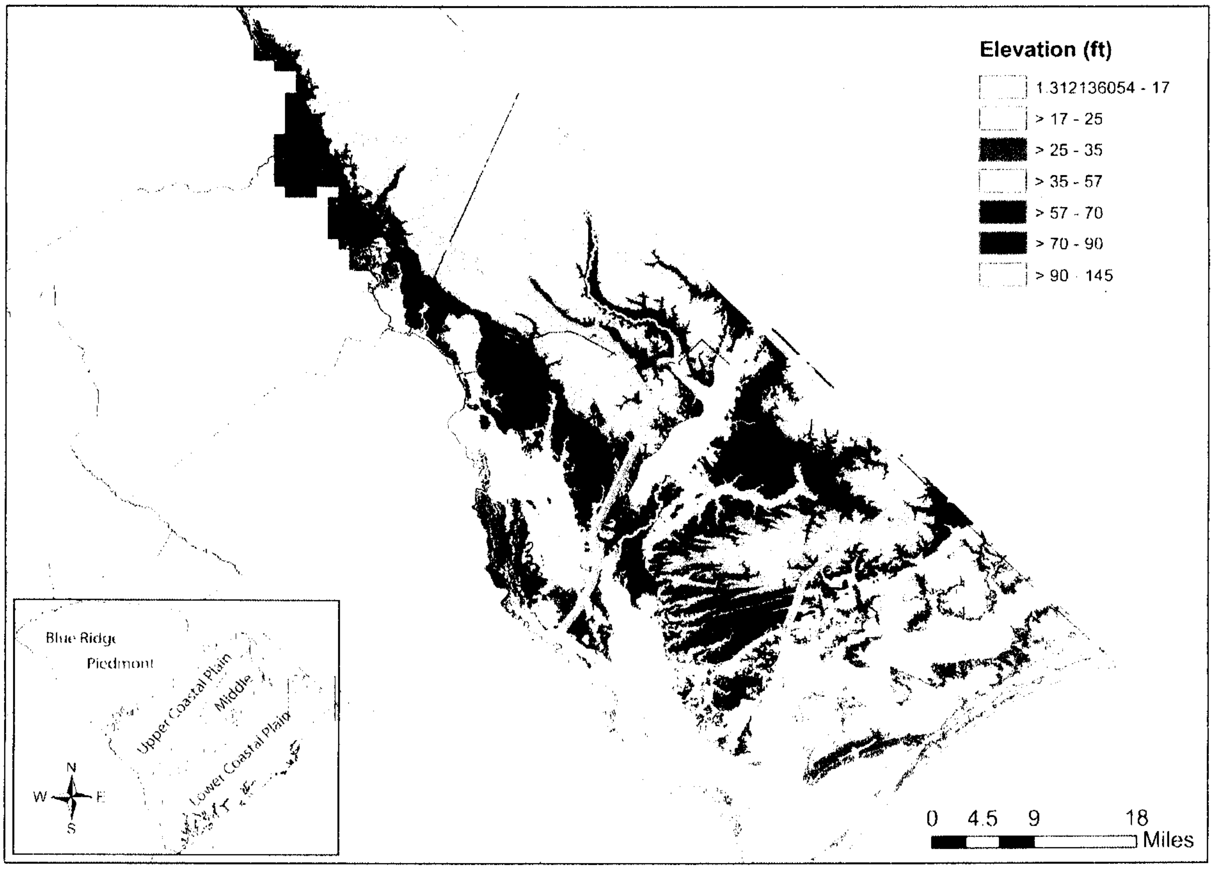
8.7 Sediments

Both the Middle and Lower Coastal Plain are underlain by siliceous and carbonate sediments of Cretaceous deposits. Not shown on Figure 1 are the exposures of the Cretaceous Pee Dee Formation along parts of the Little Pee Dee River. These are low banks exposed during typical or low water conditions. The Pee Dee Formation is composed of sand, silt and numerous fossils. One fossil to note is the belemnite, *Belemnitella americana,* a squid-like fossil.

At the surface, the Middle Coastal Plain is composed of gravel, sand, silt, clay, lime and limestone, and peat of Pliocene to Pleistocene age (5.3 million-12 thousand years). These deposits are mostly marine sediments with fluvial sediment along modern rivers. Subsequent changes in sea level often removed much of the previous sediments as far down as the Cretaceous. The sea-level events also reoccupied rivers valleys forming estuaries. Fluvial sediments are often preserved along the valley edges forming stepped terraces over time.

The Lower Coastal Plain sediments are Pleistocene to Recent (<2.6 million years). They are mostly fluvial-estuarine sediments consisting of fossil material, sand, silt and clay with recent fluvial sediments along modern rivers. Stream deposits occur in terraces along river valleys (Figure 2).

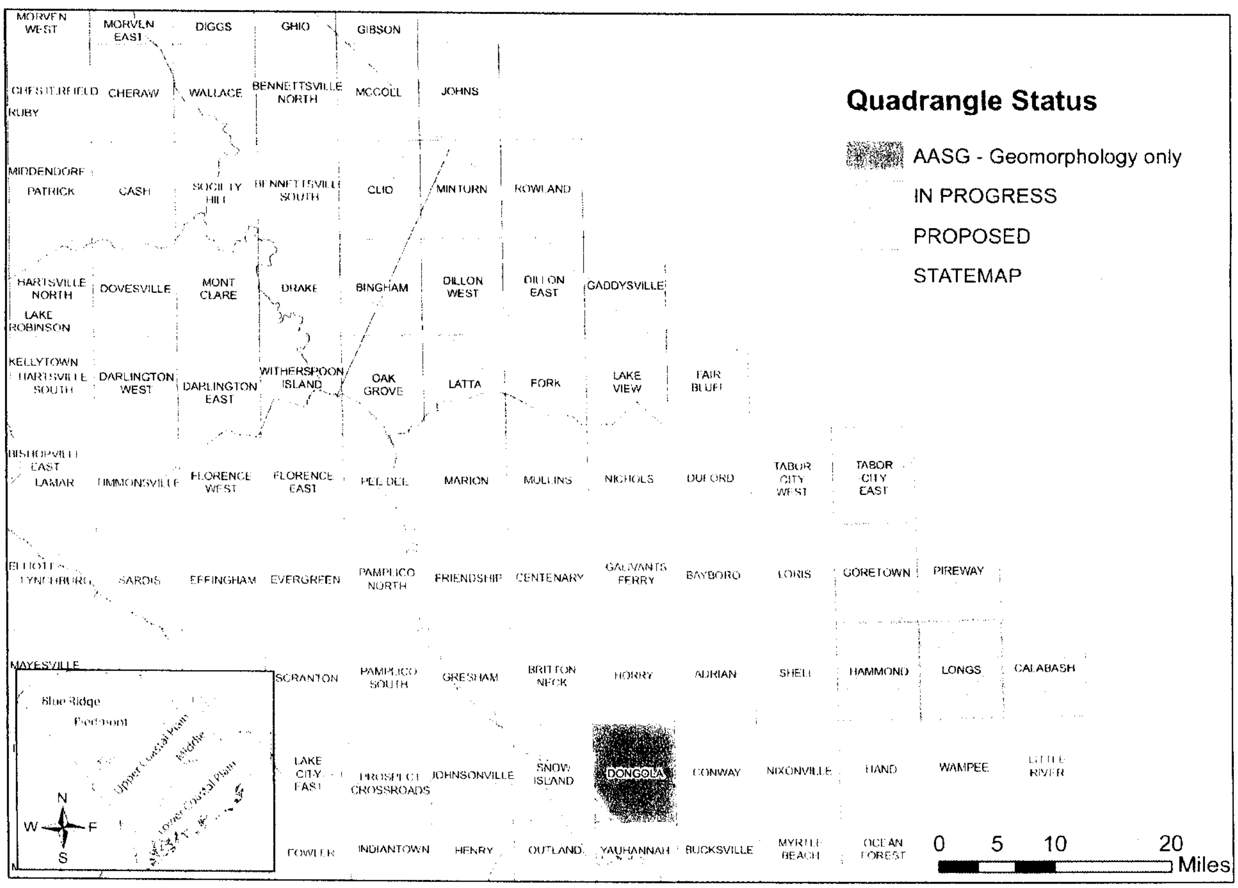
Figure 2: Topographic map of area surrounding Little Pee Dee-Lumber basin.



8.8 Geologic Resources

The various size and shape (texture) of the coastal plain sand is the source of large deposits useful for many industries from fill sand to industrial silica. Deposits of Fuller's earth have agricultural and industrial uses. If the clay content is high enough then it can be used as pond linings or local confining units. Some of the cemented or chemically altered rocks have been useful as dimension stone.

Figure 3: Available geologic maps in Little Pee Dee-Lumber basin. Color key: light red, mapping in progress, to be completed September 2015; dark red, mapping to commence October 2015; light brown, maps available in digital or paper format; dark brown, map available, paper format only. For quadrangle abbreviations see SCDNR GIS Data Clearinghouse.



9. Cultural Resources

Native Americans, primarily the Pee Dee Indians, made their living along the landscape of the Little Pee Dee-Lumber Focus Area. Early on, these Native American villages were located near the river, usually on a higher elevation bluff or river terrace. The rivers provided food and a means of transportation via canoes dug out of cypress logs. In 1685, the Little Pee Dee River became a part of Craven County in the province of Carolina, one of four counties ordered by the Lords' Proprietors to be used as election districts for the Assembly. At the time, most of the county was populated by Native Americans. To better settle the backcounty, in the 1730s, Governor Robert Johnson and Colonel John Barnwell proposed the township plan for orderly settlement along the major rivers of South Carolina, one of which was the Queensbourgh township located on the Pee Dee River. This township was settled by the Welsh Baptists from Wales, Great Britain and from Delaware and Pennsylvania. Later, the land adjacent to Queensbourgh along the Pee Dee River, Little Pee Dee River and Lynches Creek was known as the Welsh Tract or Neck. Settlers began moving into the Welsh Neck between the Great and Little Pee Dee Rivers. As the landscape filled, subsequent settlers moved into the Little Pee Dee River basin with the river serving in the capacity of today's interstates to move goods and allow for travel to neighboring towns. Cultural and historic resources of the Little Pee Dee-Lumber Focus Area are exemplary, worthy of protection and additional documentation.

10. Recreation

The wetlands and waterways of the Little Pee Dee-Lumber Focus Area long have been known to sportsmen as providing unparalleled hunting, fishing and boating opportunities, but naturalists, birders, photographers, hikers and canoeists also have discovered the many scenic attributes of rivers, marshes and swamps. The area has a strong and enduring hunting and fishing culture. The extensive bottomland forests are a significant wood duck production and wintering ground, and the Focus Area is now a priority waterfowl restoration area where many partners are implementing research and management to improve waterfowl habitat and populations.

Abundant waters and wetlands provide for some of the finest freshwater fishing in the state. The rich waters of the Little Pee Dee are an outstanding fishery resource for catfish, sunfish and largemouth bass. From the most recent SCDNR creel survey data, anglers seek out bream the most and specifically target the redbreast sunfish. Recreational boating in canoes and small power boats is also popular year round and many camping spots are found along sand beaches and ridges along the river. Outside enthusiasts no matter their means of exploring the outdoors can access the Little Pee Dee River via 13 boat ramps or through the Little Pee Dee Heritage Preserve within the Focus Area. The Lumber River can be accessed via 2 boat ramps (Table 5).

Table 5: Public boat ramps in the Little Pee Dee-Lumber Focus Area

Name	Waterbody	Latitude/Longitude
Causey	Lumber River	34.29273, -79.07422
Davis	Little Pee Dee River	34.02797, -79.30802
Fort Retch	Little Pee Dee River	34.18607, -79.17065
Gilcrest	Russ Creek	34.19885, -79.16842
Gunters Lake	Gunters Lake	33.9496, -79.31492
Huggins	Little Pee Dee River	34.04353, -79.27115
Hughes	Little Pee Dee River	33.89022, -79.26215
Joseph Holiday	Little Pee Dee River	34.05682, -79.2485
Knife Island	Little Pee Dee River	34.0357, -79.2949
Locust Tree	Little Pee Dee River	33.95667, -79.33373
Pitts	Little Pee Dee River	33.83175, -79.24908
Red Bluff	Little Pee Dee River	34.16993, -79.19715
Ricefield Cove	Lumber River	34.2222, -79.13
Sandy Bluff	Little Pee Dee River	34.14062, -79.20567

Section 1. Summary

1.1 Executive Summary

This Conceptual Mitigation Plan is intended to provide the wetland and stream mitigation sufficient to support the approval by the US Army Corps of Engineers (USACE) for permits required for the construction of Interstate I-73 in South Carolina by SCDOT. The mitigation required for the project includes 4,163 wetland mitigation credits and 18,220 stream mitigation credits determined using the 2002 USACE Charleston District SOP.

The proposed Conceptual Mitigation Plan is structured as a permittee-responsible project and includes three sites which, when combined, address the I-73 mitigation needs of SCDOT.

The first site, "Joiner Bay", is a landscape scale wetlands restoration project with multiple wetland types matching the various impacted habitats along the I-73 corridor. The site is located two miles from the I-73 Preferred Corridor in western Horry County within the same watershed containing the majority of the wetland impacts. The site will produce 2,663 wetland restoration credits determined using the 2002 Charleston SOP, along with an allowance to cover temporary impacts associated with road construction.

The second site, "Brittons Neck", is a coastal plain stream restoration site located in the watershed covering the northern section of the I-73 Preferred Corridor. This site will produce 18,220 coastal stream credits, of which over 85% are restoration, determined using the 2002 Charleston SOP.

The third site is the Sandy Island Mitigation Bank. SCDOT will utilize the remaining 1,500 credits as part of this Conceptual Mitigation Plan.

	Wetland	Stream
Joiner Bay Site	2,663	
Brittons Neck Site		18,220
Sandy Island Mitigation Bank	1,500	
Totals	**4,163**	**18,220**
% Restoration	64%	85%
Mitigation Requirement	4,163	18,220
Requested Variance	n/a	n/a

1.2 Mitigation Requirement

I.2.1 Background and Overview

The mitigation requirements for I-73 in South Carolina include the following:

(a) 4,162.9 wetland credits (of which 50% must come from restoration activities);

(b) 18,220 stream mitigation credits (of which up to 75% may be preservation); and

(c) An estimated 10.92 credits to address temporary impacts associated with road construction activities.

1.2.2 Regulatory Assumptions

Regarding the type of mitigation required for the SCDOT projects, the following assumptions have been made based on agreements resulting from the EIS process:

(a) the mitigation credit calculations are defined based on the 2002 Charleston SOP. During the preparation of the EIS the Agency Coordination Team (ACT), comprised of state and federal resource and regulatory agencies, agreed that the USACE mitigation SOP would provide a method for assuring that adequate mitigation would be provided for wetland and stream impacts associated with the construction of I-73. At the recommendation of the members of ACT it was agreed that wetland and stream mitigation impacts were to be calculated for each 11-digit Hydrologic Unit Code (HUC) in which the impacts occur. The SOP was to then be used to calculate the required mitigation credits for the wetland and stream impacts in each group.

(b) the mitigation is required to offset impacts in HUCs 03040204, 03040201, and 03040206, but the mitigation project site may be located in any of these HUCs based on overall watershed benefits to address the impacts across multiple HUCs ;

(c) one large-scale project is preferable to multiple project sites;

(d) a portion of the wetland mitigation need will be satisfied by the SCDOT Sandy Island Mitigation Bank (1,500 wetland preservation credits); and

(e) there is no requirement or desire to locate mitigation in any specific county as long as the SOP requirements are met.

The State newspaper - I-73 article
Dawn Harris-Young to: Heinz Mueller, Kelly Laycock 05/23/2011 11:16 AM

http://www.thestate.com/2011/05/21/1827288/swamps-wildlife-at-risk.html (with video)

Posted on Sat, May. 21, 2011

Swamps, wildlife at risk

By SAMMY FRETWELL
sfretwell@thestate.com

Frank Oliver, a local naturalist and wildlife educator, walks through the Little Peed Dee Heritage Preserve, just north of where I-73 will pass. Oliver pointed to the many plants, animals and natural resources in the area.

- Gerry Melendez /gmelendez@thestate.com

A new interstate will tear through hundreds of acres of wetlands, including those along the scenic Little Pee Dee River. The area, home to an array of plants, animals and natural resources, is one of the state's most scenic, but is in the path of a road the tourism leaders and politcians say is desperately needed to boost the state's economy.

- Gerry Melendez /gmelendez@thestate.com

Lake Swamp remained dark and cool, even as a bright spring day cast the rest of this rural crossroads in brilliant sunlight.

Tiny blue swallows dove across the swamp's tea-colored water. Tree frogs hiccupped in the deep forest of cypress and tupelo trees. Warblers and grackles chirped, as a red belly water snake skittered through the marshy lowland.

"It was a striking place," Marion County naturalist Frank Oliver said, reflecting on a trip to the swamp in early May. "What struck me were those giant, old-growth cypresses and the diversity of wildlife. We were just spotting everything."

In the next decade, a $2.4 billion superhighway is projected to slice through Lake Swamp en route to the Myrtle Beach area – and the road's toll on the landscape has touched off a dispute that threatens to become South Carolina's biggest environmental battle in years.

The disagreement, which pits federal regulators and environmentalists against Myrtle Beach tourism boosters, has sparked lively discussion about the cost of the road versus the need to ferry vacationers to the coast – and get them out quickly if there's a hurricane – as well as improve the economy.

But at the core of the dispute are the swamps, forests and wildlife that distinguish eastern South Carolina from the rest of the state.

To reach the Grand Strand, Interstate 73 would destroy an unusually large amount of wetlands as well as some of the most significant stretches of hardwood swamps in the state, if not the Southeast.

The U.S. Environmental Protection Agency has twice recommended denying a permit to fill 272 acres of wetlands, saying the road will hurt "aquatic resources of national importance." The EPA doesn't routinely take such stances in South Carolina.

If the EPA's concerns aren't satisfied, its opposition could force the road to be redesigned or even stopped.

Mitchell Metts, the S.C. Department of Transportation's engineer in charge of I-73, said his agency has made changes in the original highway design to limit the road's effect on eastern South Carolina. But he acknowledged that it's impossible to design and construct an interstate without affecting the environment.

"You can't build a road with zero impact," Metts said.

White sand and black bears

The proposed I-73 corridor lies in the Pee Dee region, long known for stock car racing, tobacco farming and cheesy roadside attractions. But the area also is full of remote wetlands, rare geological features, unusual plants and an array of wild animals.

Along the freeway's path, you can find glassy, quiet rivers; majestic cypress and oak trees; and thickets of berry bushes filled with succulent fruit. Brilliant white sand, like that seen on tropical beaches, lines some of the region's biggest streams, such as the Little Pee Dee River.

Compared to other parts of the state's coastal plain, the Pee Dee region is filled with sand ridges that give it higher elevation, but river swamps and seasonal wetlands are also plentiful. In some ways, the area is more like the sandhills of eastern North Carolina than the Lowcountry of South Carolina, Clemson University biologist Patrick McMillan said.

Carving up this habitat with a freeway could make it harder for wildlife to move through the landscape, thus making it more difficult for populations to forage for food or reproduce, according to environmental research done for the DOT. A new road also could pollute creeks and swamps with runoff.

All told, more than 400 different varieties of land and aquatic animals may be found along the I-73 corridor, the research shows.

Black bears, bobcats, mink, otters, marsh rabbits, white-tailed deer, bald eagles, barred owls, and red-shouldered hawks are some of them. The Carolina wren, the state bird, also lives there.

Few endangered species have been verified, but the federally protected shortnose sturgeon has been identified as a species that may live in the Little Pee Dee.

McMillan said many people don't realize the significance of the area's natural resources. Unlike the mountains near Greenville or Charleston's Lowcountry, the state's Pee Dee region isn't a big attraction for tourists wanting to see its natural wonders, he said.

"It's the most overlooked region of the state when we talk about biodiversity," McMillan said. "It's probably our most important region when you look at the number of rare and endangered plants there. It is unique."

Some plants grow almost exclusively in the Pee Dee region in South Carolina. Those include sedges and bright flowers that sprout when river levels drop and expose large, sandy beaches, McMillan said.

Eastern South Carolina rivers also contain fish, including the Sandhills chub and the Carolina pygmy sunfish, that don't live anywhere else in the state, he said. No one is sure why these fish are found primarily in rivers such as the Little Pee Dee, but such waterways are relatively undeveloped and clean.

Overall, the new interstate is supposed to cross 23 different streams and affect about 300 acres of wetlands, including 272 that will be filled.

The area to be affected extends from the North Carolina border north of McColl to near Conway, where I-73 would hook up with S.C. 22, an interstate-style road already built to northern Myrtle Beach.

Of particular concern to the EPA are areas near the Marion-Horry county border along the Little Pee Dee River. That's where the first leg of the road, from I-95 to S.C. 22, would cross.

The state-owned Little Pee Dee Heritage Preserve covers 10,000 acres. The road would destroy some 30 acres of the preserve east of Mullins. At nearby Lake Swamp, more than 130 acres of bird habitat may be affected.

Owls and mystery cats

To Oliver, the swamps, rivers and wildlife of the Pee Dee region are special.

A wildlife educator who teaches children about the local environment, Oliver has fished, hunted and hiked the woods of Marion, Dillon and Horry counties all his life. His children spend as much time in the woods as most kids spend at Little League games. So he's keenly interested in how I-73 affects the area.

On a recent walk through the heritage preserve near where I-73 would cross, Oliver stepped softly as he inched toward an old hardwood tree, looking skyward. Perched silently on a branch 20 feet above him was a nocturnal bird with piercing eyes that most folks don't see during daylight hours.

"You see where the forks in the branches are?" Oliver said. "There's an owl on that little limb. It looks like a juvenile. An Eastern barred owl."

The forest around him included cypress, green ash, tupelos and overcup oaks, big hardwoods that grow only in certain habitats. In some cases, forest trees soared 80 feet into the air. Some of the trees had wide bottoms characteristic of species that live in swamps.

As he stopped to look at a plant, Oliver recalled the times he's seen mink in the wooded swamps. These animals, best known for the soft fur used in women's stoles, are ferocious predators that don't hesitate to kill larger creatures.

"They can eat off a muskrat for two or three days," he said with a chuckle.

Oliver said he's even heard stories about "wompus cats," mysterious black felines that resemble South American panthers, stalking through swamps along the Little Pee Dee River.

Near an oxbow lake not far from the main stem of the Little Pee Dee River, he grabbed a high-brush blueberry plant and explained that they're a favorite of black bears, which crave the sugary fruit.

Black bears travel up and down the deeply forested Little Pee Dee River corridor between eastern North Carolina and South Carolina's Lowcountry. Locals call them "hog bears," because many of the animals are a smaller variety of black bears, often no more than 140 pounds, Oliver said.

Oliver remembers seeing a hog bear lumber across S.C. 917, within a few hundred yards of where I-73 will span the Little Pee Dee River at the Horry-Marion county line.

Oliver, senior vice president with the conservation group Wildlife Action Inc., said the water on the Little Pee Dee River looks dark because of decaying organic matter, but it actually is some of the clearest you'll find in South Carolina. The river is underlain with sand that, he said, helps keep it from becoming murky.

Across the oxbow about 100 yards away, Spanish moss-covered hardwoods reflected on the water's surface. The water was flat except for one creature that swam toward the middle of the lake. A small point was visible at the water's surface as the organism swam, but it was difficult for Oliver to determine what was making its way through the oxbow.

Sensitive design

Road boosters say they understand the significance of the Pee Dee's natural heritage and have supported measures to reduce the impact of I-73 on the landscape.

Among other things, the DOT plans to restore a heavily degraded swamp to offset losses at the Little Pee Dee Heritage Preserve, Lake Swamp and other wetlands in the road's path. The DOT, which notes that an environmental impact report approved of the road, also has modified plans to avoid some sensitive areas. DOT officials said the route chosen for I-73 will have less impact on the environment than about a half dozen other possible routes.

Now, it's time for South Carolina to move ahead, road boosters say. The interstate could create 29,000 jobs while helping tourists escape a hurricane more easily, according to the Myrtle Beach Area Chamber of Commerce. Road opponents challenge the job projections.

"The planned route for I-73 minimizes wetlands impact, so if we must trade a few acres of swampland for 29,000 jobs, we're ready to do so today," a statement from chamber president Brad Dean said. "South Carolina needs jobs, and I-73 will create more jobs than any other project in South Carolina's history. With all due respect to the spotted owl and other creatures, we need I-73 now or our South Carolina worker will be facing extinction."

The entire road would extend from Michigan to Myrtle Beach. South Carolina highway commissioners, led by chairman Danny Isaac of Myrtle Beach, want the road so badly that they agreed last month to spend more than $100 million for a small part of the road – even though most of the freeway hasn't been fully funded.

But David Farren, a Southern Environmental Law Center attorney, said he's happy about the EPA objections. Standing on a small, two-lane road at Lake Swamp earlier this month, Farren noted that things will change if an interstate brings cars zooming through at 70 mph.

"It would be a constant roar of traffic," he said.

Conference Call Agenda

May 16, 2011

2:00pm

- **Introductions, purpose of call**
- **SCDOT brief introduction of project and EIS process**
- **Discussion of EPA concerns**
  - **Alternative analysis**- how was SR 501 corridor considered, what wetland layer was used in study (i.e. NWI), discussion of new information in March 2011 study by Smart Mobility
    - The applicant stated that purpose and need would not be met by an expressway
    - Interstate using the alternative 7 of the FEIS would have greater wetland impacts than the preferred alternative according to infrared imagery.
    - Alternative 7 utilized portions of 501, however large portions of this route were also new road. The applicant states the portions of this route not considered in the last round of alternatives would have required a greater amount of home relocations as well as having wetland impacts.
    - The applicant stated that the Transportation Secretary listened to SELC regarding this study but did not supply comments.
    - When asked about the flexibility of an expressway, it was stated that in general, it would be more flexible than an interstate, but it could cause other issues such as unsafe intersections, etc.
  - **Preferred alternative impacts**- use of October 2010 SOP to calculate impacts, documentation of effort to avoid and minimize impacts to ARNIs, information to show why impacted areas are deemed as impaired
    - Applicant has agreed to use the new SOP
    - Applicant states that DNR State Heritage Preserve Board has already agreed to the project crossing the property and a mitigation plan for those impacts. However SCDNR is asking for the applicant to explore using existing road corridors in March 28, 2011 letter.

    - **Mitigation** – use of mitigation banks vs. permittee-responsible mitigation, use of watershed approach, establishing baseline data and success criteria for each wetland restoration type, stream mitigation information request from EPA.
        - The applicant deferred to USACE for these questions. USACE stated that they were unprepared to address the questions in full at this point but had concerns with the amount of mitigation needed and the available credits in mitigation banks within the service area.

- **General Discussion**

- **Adjourn**

http://www.thesunnews.com/
Sunday, May 15, 2011
Posted on Sun, May. 15, 2011

New Looks at I-73

The flurry of recent news about Interstate 73 has left us feeling alternately hopeful, worried, unsure and conflicted.
First came the encouraging news that after years of waiting, the state Department of Transportation had approved the opening piece of the long-discussed highway in the form of a $185 million interchange with Interstate 95 near Latta.
Then we learned that the interchange rose to the top of the DOT's list of projects by leapfrogging other needs that had been deemed a higher priority, a move that has left a bad taste in some mouths. And the project would rely on using up most of the DOT's bonding capacity, which could leave the agency less able to make emergency repairs if needed.
Meanwhile, as part of the process for constructing the interchange, the DOT submitted its wetland permit application for the entire highway to the Army Corps of Engineers for review and public comment, and the federal Environmental Protection Agency responded with two letters that called for denying the permit, saying that the road would destroy more wetland than necessary and suggesting instead that the state consider expanding U.S. 501/S.C. 38.
Supporters of I-73 haven't been sitting idly by. A who's who of Grand Strand leaders trooped to Washington, D.C., last week to push for the road, including Myrtle Beach Mayor John Rhodes and City Council members Randal Wallace, Mike Chestnut and Wayne Gray; Surfside Beach Mayor Allen Deaton and Town Council members Vicki Blair and Bob Childs; North Myrtle Beach Mayor Marilyn Hatley; Horry County Council Chairman Tom Rice and Councilman Paul Prince; Horry County Auditor Lois Eargle; S.C. Lt. Gov. Ken Ard and his chief of staff, Brant Branham.
And on Thursday, an economic study was unveiled in full at the offices of the Myrtle Beach Area Chamber of Commerce, predicting that the completion of I-73 would bring more than 22,000 jobs to the state and 7.1 percent more tourists to the Grand Strand.
The wrinkle in all of it, however, is when that completion might occur. State Rep. Tracy Edge told The State newspaper that EPA objections "could set the project back years." And even if that first interchange succeeds in being built, there's no funding assured for the rest of the $2.4 billion project.
City Councilman Wallace said "we heard a lot about how they don't have any money" at the I-73 booster meetings in D.C. last week. Those 22,000 jobs and the growth in tourists could still be a decade or more away.
It's that long and unsure timetable that has us at least intrigued by the competing proposal, cited by the EPA and suggested by environmental groups: upgrading the current U.S. 501/S.C. 38 corridor instead of building a brand new interstate.
U.S. Sen. Lindsey Graham responded to the EPA's letters by blasting what he called "an overreach by unelected bureaucrats." We're not engineering or environmental experts, but we also don't believe a person necessarily has to be elected to be right.
Nancy Cave, North Coast director of the Coastal Conservation League, and David Farren of the Southern Environmental Law Center are pushing for the Grand Strand Expressway, a project they say could fulfill the purpose and intent of I-73, but faster, cheaper and with less environmental impact. Instead of spending $1.3 billion to build a new highway from I-95 to S.C. 22, they suggest spending about $150 million to upgrade the current roads.
Supporters of I-73 are having none of it, saying the option has already been studied and discarded as too expensive and harmful to the environment. "We investigated the possibility of upgrading existing roads," said state Rep. Alan Clemmons, also chairman of the National I-73/74/75 Corridor Association, "and in fact Ms. Cave's group was involved in that process, and it was determined that such an alternative was unfeasible."
Indeed, DOT Deputy Director Bob Probst said in 2003 that it would cost twice as much to build the highway along existing roads as to make a new route. But Cave and Farren think the idea deserves another look, saying the idea was studied with the wrong assumptions the first time. When it was looked at initially it was with the idea of constructing a brand new interstate on top of the existing roads, requiring about 400 feet of right of way width. The expressway that Cave and Farren are suggesting would be a less dramatic upgrade, requiring only about 100 feet of right of way.
The Coastal Conservation League commissioned a small report on the Grand Strand Expressway, but is hoping for a larger, more detailed study that members believe would prove their point. Cave said the study could be done in about six months for less than $200,000.
We have no wish to drag out the building of I-73 any longer than necessary, but six months from now we'll still likely be waiting on the permit approval for the current plan. If we can use that time to explore the idea of an alternative that would provide the same benefits faster and cheaper, it's at least worth taking a closer look at.
If it's determined that upgrading existing roads is a real possibility, than we've saved ourselves a billion dollars. If it's determined that is not feasible then it can at least be said that our leaders tried to save taxpayers money and made a good faith effort to address these persistent concerns.

AERIAL PHOTOGRAPHIC ANALYSIS
COMPARING AQUATIC IMPACTS OF S.C. 38/U.S. 501 UPGRADE WITH PROPOSED I-73

DILLON, MARION, & HORRY COUNTIES, SOUTH CAROLINA

March, 2012

Prepared by:

Donley E. Kisner
Environmental Research, Inc.
5267 John Marshall Hwy, Suite C
Linden, VA 22642

Prepared For:

Southern Environmental Law Center
&
Coastal Conservation League

The following report represents my best professional judgment based on the analysis of aerial photography and the review of site maps and other identified documents.

Donley E. Kisner

Donley E. Kisner, Vice President/Senior Wetlands Analyst

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EXECUTIVE SUMMARY

The South Carolina Department of Transportation ("SCDOT") proposes to construct a new interstate to the Myrtle Beach area, which would be designated I-73, with a priority focus on the section of the project between I-95 and the Myrtle Beach area. The proposed new location I-73 would closely parallel the existing primary route to Myrtle Beach, but would have far greater aquatic impacts.

The report, which relies on aerial photographic analysis and other available documentation as described, quantifies the wetlands that would be impacted by an upgrade to an interstate or expressway for portions of S.C. 38 and U.S. 501 between I-95 and the Conway Bypass (S.C. 22). Using either a three-hundred-foot wide footprint, or a two-hundred-foot wide footprint, the analysis demonstrates that the number of wetland acres that would be impacted by upgrading the existing highway corridor would be significantly less than the amount of wetlands that would be impacted by the new interstate highway, I-73, at the location proposed by SCDOT.

According to the permit application submitted to the Department of the Army and the South Carolina Department of Health and Environmental Control by the SCDOT for a permit to place fill associated with the construction of a new four-lane interstate roadway, 313 acres of wetlands would be impacted by this segment of the proposed new location I-73. By contrast, upgrading the existing corridor would impact approximately 119 acres of wetlands based on a three-hundred-foot wide footprint and approximately 50 acres of wetlands based on a two-hundred-foot wide footprint.

Acres of wetlands impacted by Interstate 73 proposed route	313	Acres of wetlands impacted by a 300' wide upgrade route	118.9	Acres of wetlands impacted by a 200' wide upgrade route	49.5

According to the permit application submitted by the SCDOT, 13 perennial streams totaling 3,155 linear feet and 9 intermittent streams totaling 705 linear feet would be disturbed by the proposed new location I-73 between I-95 and the Conway Bypass. This equates to 22 stream crossings totaling 3,860 linear feet of stream disturbance. Twenty-four perennial and 12 intermittent streams were identified using both aerial photographs and U.S. Geological Survey topographic maps along the existing route for the upgrade alternative. Exact linear footage of additional impacts would depend on the upgrade design, but the corridor is already a divided four-lane highway. Consistent with the wetland impacts, it is reasonable to conclude that there would be significantly less disturbance to streams by adding a minimal amount of additional linear footage to these already-impacted streams by upgrading the existing corridor compared to the disturbances that would occur to twenty-two new stream crossings if I-73 were to be constructed.

Number of new stream crossings impacted by Interstate 73 proposed route	22	Number of new stream crossings impacted by upgrade route	0

STATEMENT OF OPINIONS

Aerial Photographic Analysis

Environmental Research, Inc. was contacted by the Southern Environmental Law Center and the Coastal Conservation League, to acquire aerial photography and conduct a wetlands analysis of the I-73 alternative corridor in Dillon, Marion, and Horry Counties, South Carolina. The I-73 alternative corridor would consist of upgrades to portions of S.C. 38 and U.S. 501 that are located between Interstate 95 (northern end of the study area) and S.C. 22 (southern end of the study area). S.C. 22 is also known as the Conway Bypass. The I-73 alternative site is located on the Oak Grove, Latta, Marion, Mullins, Centenary, Galivants Ferry, and Horry 7.5-minute topographic maps produced by the United States Geological Survey.

The general purpose of the analysis is to determine whether the impacts to wetlands and streams, as a result of utilizing currently existing highway segments as an alternative to constructing a new interstate highway, would be smaller or larger.

The findings from the aerial photographic analysis show that within a three-hundred-foot wide corridor superimposed on the existing portions of S.C. 38 and U.S. 501, between Interstate 95 and S.C. 22, there are approximately 119 acres of wetlands, and within a two-hundred-foot wide footprint there are approximately 50 acres of wetlands.[1] These are the acreages of wetlands that would be impacted if the entire portions of either of these footprint widths were required in order to upgrade this existing highway corridor to either an expressway or an interstate.

For the purpose of presenting wetland acreage findings from the aerial photographic analysis, the study area is divided into three sections: the Marion Bypass; the Little Pee Dee River floodplain; and the remaining section of the study area, which consists of three additional, non-contiguous, portions of highway. These additional portions of the study area (referred to as Other Areas) are located north of the Marion Bypass terminating at Interstate 95, south of the Marion Bypass terminating at the Little

[1] Federal guidance states that the desirable rights-of-way needed to accommodate large trucks without allowing vehicles to encroach on curbs of shoulders, ranges from approximately 140 foot for four-lane arterials to approximately 165 foot for eight-lane arterials. See Federal Highway Administration, Alternative Intersection/Interchanges Informational Report (April, 2010). Accordingly, a two-hundred-foot wide corridor represents a most realistic, but conservative footprint of the anticipated impact of a further upgrade of the existing corridor.

Pee Dee River floodplain, and south of the Little Pee Dee River floodplain terminating at S.C. 22.

The Marion Bypass has 31.2 acres of wetlands that lie within the three-hundred-foot wide footprint centered on the existing highway and 2.4 acres of wetlands that lie within the two-hundred-foot wide footprint. The Little Pee Dee River floodplain has 37.9 acres of wetlands that lie within the three-hundred-foot wide footprint of the existing highway and 35.1 acres of wetlands that lie within the two-hundred-foot wide footprint. The three additional, non-contiguous, portions of highway have a combined total of 49.8 acres of wetlands that lie within the three-hundred-foot wide footprint of the existing highway and 12 acres of wetlands that lie within the two-hundred-foot wide footprint. This equates to a total of 118.9 acres of wetlands that lie within a three-hundred-foot wide footprint of the existing highway and 49.5 acres of wetlands that lie within a two-hundred-foot wide footprint for the entire route.

In addition, it should be noted that the aquatic resources within the footprint of the upgrade alternative have already been impacted in a number of ways along the corridor. For example, wetland water regimes (duration of inundation or soil saturation) have been reduced due to the construction of drainage ditches and impoundments. These impacts were the result of both the original highway construction and follow-on highway improvements, as well as common practices used to increase the acreage of land that could be utilized for agriculture. Further, reductions in the way water moves through many of the wetlands adjacent to the highway (wetland connectivity) have been significantly impacted. Causeways constructed to reduce the length of the bridges crossing the floodplain have already impacted the larger wetlands in the Little Pee Dee River floodplain. Therefore, the Little Pee Dee River floodplain, which would be significantly impacted by the I-73 proposal, would experience minimal additional impacts to wetlands if the alternative were chosen due to the upgrades that have already been performed on this section of the route and the size of the highway footprint that already exists along this portion of U.S. 501.

FIGURES

The conclusions in this report are illustrated in the following figures, which are described below in sequence.

FIGURE 1:

Figure 1 is a mosaic of the Florence and Kingstree 1:100,000-scale United States Geological Survey topographic maps. This figure depicts both the approximate location of the SCDOT's proposed route I-73 as a new location interstate highway closely paralleling the alternative existing route which could be upgraded along portions of S.C. 38 and U.S. 501 between Interstate 95 and S.C. 22. This figure also contains summary tables containing information on the differences in wetlands and stream impacts between the proposed route for I-73 and the alternative route, which is discussed in greater detail throughout this report.

FIGURE 2:

Figure 2 is a mosaic of the Florence and Kingstree 1:100,000-scale United States Geological Survey topographic maps. This figure depicts the locations of the three sections along the alternative route (the Marion Bypass, the Little Pee Dee River floodplain, and the remaining section of the study area which consists of three additional, non-contiguous, portions of highway) discussed for ease of understanding the conclusions in this report. It also includes again the approximate location of the SCDOT's proposed route for a new location interstate highway.

FIGURE 3:

Figure 3 and the following figures utilize a mosaic of aerial photographs taken at various times during the leaf-off season in early 2010. These figures illustrate comparisons between the landscapes of the proposed route for the new interstate highway and that of the proposed alternative utilizing existing portions of S.C. 38 and U.S. 501, located between Interstate 95 and S.C. 22. This figure depicts the Marion Bypass along the alternative route with the approximate location of this section of the proposed new interstate to the east. The Marion Bypass has 31.2 acres of wetlands that lie within the three-hundred-foot wide footprint of the existing highway and 2.4 acres of wetlands that lie within the two-hundred-foot wide footprint.

Within this report there are no breakouts of wetland acreages that are impacted by comparable sections of the proposed new interstate highway, such as the Little Pee Dee River floodplain, due to the unavailability of those statistics in the permit application for I-73.

FIGURE 4:

Figure 4 depicts the Little Pee Dee River floodplain along the upgrade route with the approximate location of this section of the proposed new interstate to the east. The Little Pee Dee River floodplain has 37.9 acres of wetlands that lie within the three-hundred-foot wide footprint of the existing highway and 35.1 acres of wetlands that lie within the two-hundred-foot wide footprint.

This figure illustrates that a much greater extent of the Little Pee Dee River floodplain would be impacted by the proposed new interstate highway than by the existing route due to the greater width of the floodplain along the proposed I-73 location and the additional crossing of the Lake Swamp tributary of the Little Pee Dee River to the south.

FIGURE 5:

Figure 5 depicts the remaining section of the study area which consists of the three additional, non-contiguous, portions of highway. These additional portions of the study area (referred to as Other Areas in Figure 2) are located north of the Marion Bypass terminating at Interstate 95, south of the Marion Bypass terminating at the Little Pee Dee River floodplain, and south of the Little Pee Dee River floodplain terminating at S.C. 22. The three additional, non-contiguous, portions of highway have a combined total of 49.8 acres of wetlands that lie within the three-hundred-foot wide footprint of the existing highway and 12 acres of wetlands that lie within the two-hundred-foot wide footprint. These portions of the upgrade alternative route are those that have received the least amount of upgrades to date.

METHODOLOGY

A search of government and commercial sources was undertaken to obtain the most current aerial photographs covering the study area, including at least one date of color infrared aerial photographs. The color infrared aerial photographs from 1999 were analyzed stereoscopically. Stereoscopic viewing involves using the principle of parallax (observing a feature from slightly different positions) to observe a three-dimensional representation of the areas of interest. This enhances the photo-interpretation process by allowing the analyst to observe vertical as well as horizontal spatial relationships of features.

Historical aerial photographs from three different dates spanning the period from 1999 to 2010 were acquired. The 1999 aerial photographs are color infrared and were analyzed stereoscopically to most effectively identify the wetlands within the study area. The two additional dates of aerial photographs are natural color and include 2009 leaf-on photographs and 2010 leaf-off photographs. These aerial photographs were analyzed to both enhance the quality of the wetlands analysis and to update changes to wetlands that had taken place since 1999. National Wetlands Inventory (NWI) wetlands data and Soil Conservation Service hydric soils data was utilized as additional collateral information to assist in the identification of wetlands. A complete list of the aerial photography and other collateral data used for this analysis can be found in the reference section of this report.

The process of photographic analysis involves the visual examination and comparison of many components of the photographic image. These components include tone, color, texture, shape, size, pattern, and landscape context of the individual elements of a photograph. The analyst identifies features and "signatures" associated with specific environmental conditions. The term "signature" refers to a combination of components and/or characteristics that indicate a specific condition or pattern of environmental significance. Academic and professional training, photo-interpretation experience gained through field reconnaissance comparing aerial photographic signatures with ground observations, repetitive observations of similar features or activities, and the deductive logic of the analyst as well as background information from collateral sources are all critical factors employed in a photographic analysis. Details related to my experience in

January 26, 2011. Joint Public Notice regarding an application by the South Carolina Department of Transportation (P/N # SAC 2008-1333-DIS). Prepared by the Corps of Engineers (Charleston District) and the S.C. Department of Health and Environmental Control.

March 25, 2011. The Grand Strand Expressway – An Alternative to the Proposed I-73 to the Myrtle Beach, SC area. Prepared by Smart Mobility for the South Carolina Coastal Conservation League.

March 28, 2011. Comments regarding "Application for Section 404 Permit/Section 401 Water Quality Certification for I-73 Project in South Carolina (P/N #2008-01333-DIS)." From J. David Farren (Senior Attorney, Southern Environmental Law Center) to Stephen A. Brumagin (U.S. Army Corps of Engineers, Charleston District) and Mark Griffin (Project Manager, S.C. Department of Health and Environmental Control).

U.S. Department of Agriculture, Soil Conservation Service, Hydric Soils of the United States – Miscellaneous Publication Number 1491.

U.S. Department of Agriculture, Soil Conservation Service, Soil Surveys for Dillon, Marion, and Horry Counties, South Carolina (SSURGO).

U.S. Fish and Wildlife Service, National Wetlands Inventory data, mapped to February 1994 aerial photographs.

Undated. Data Collection Technical Memorandum for the South Carolina Department of Transportation's (SCDOT) Interstate 73 (I-73) environmental impact statement (EIS). Prepared by the LPA Group, Inc.

APPENDIX A

Figures 1 – 5

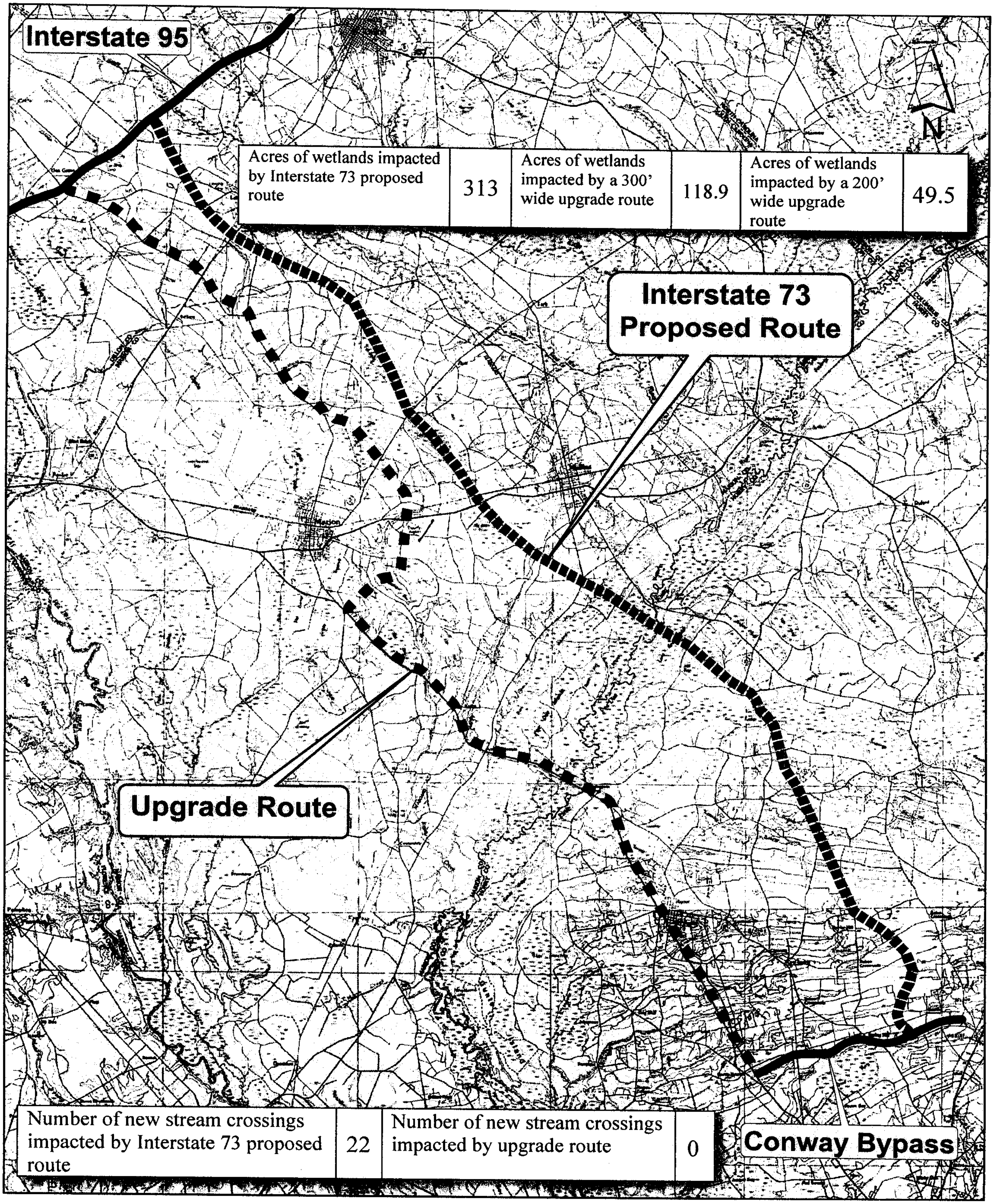


Figure 1

1 inch equals 3.95 miles

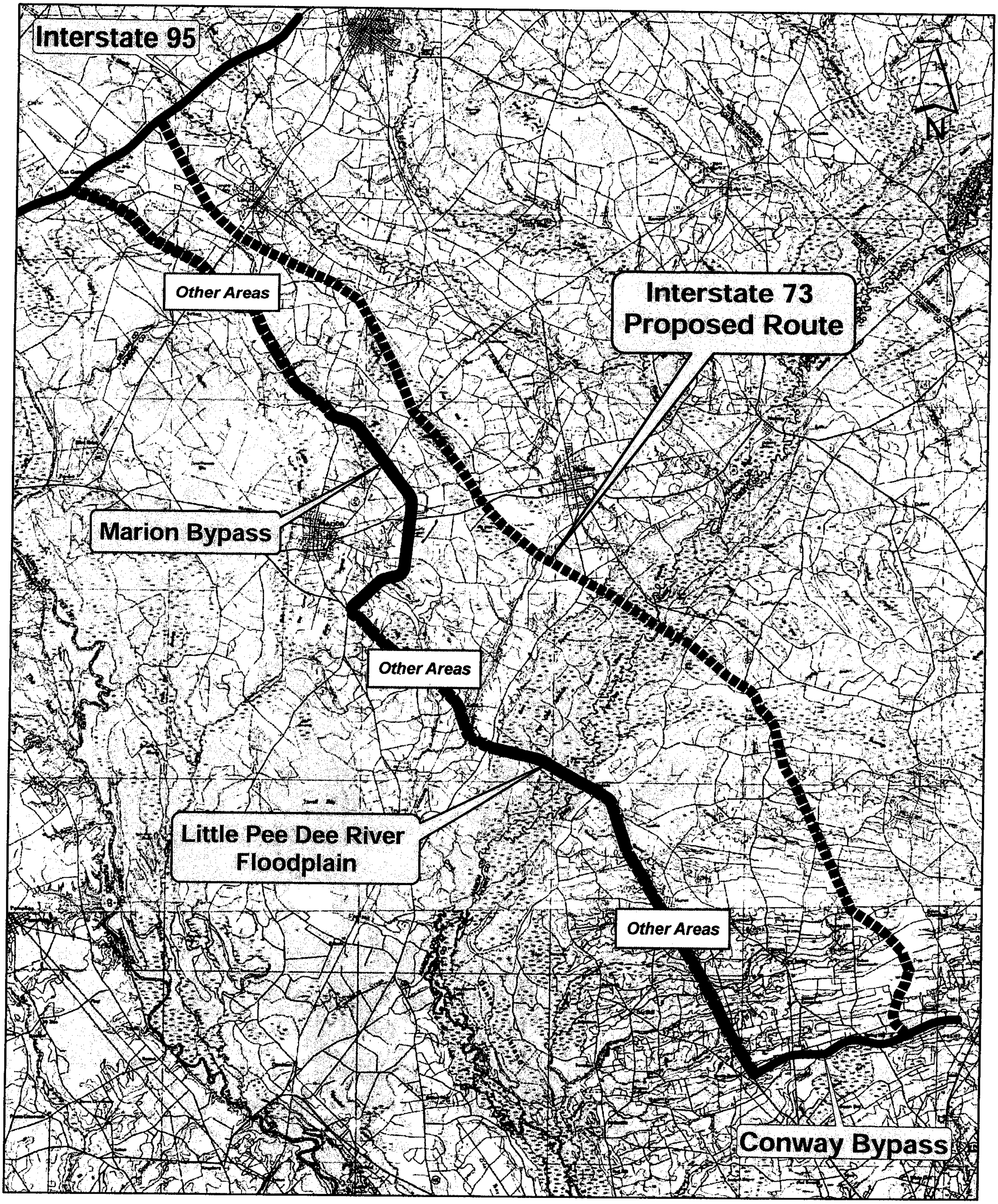


Figure 2

1 inch equals 3.95 miles

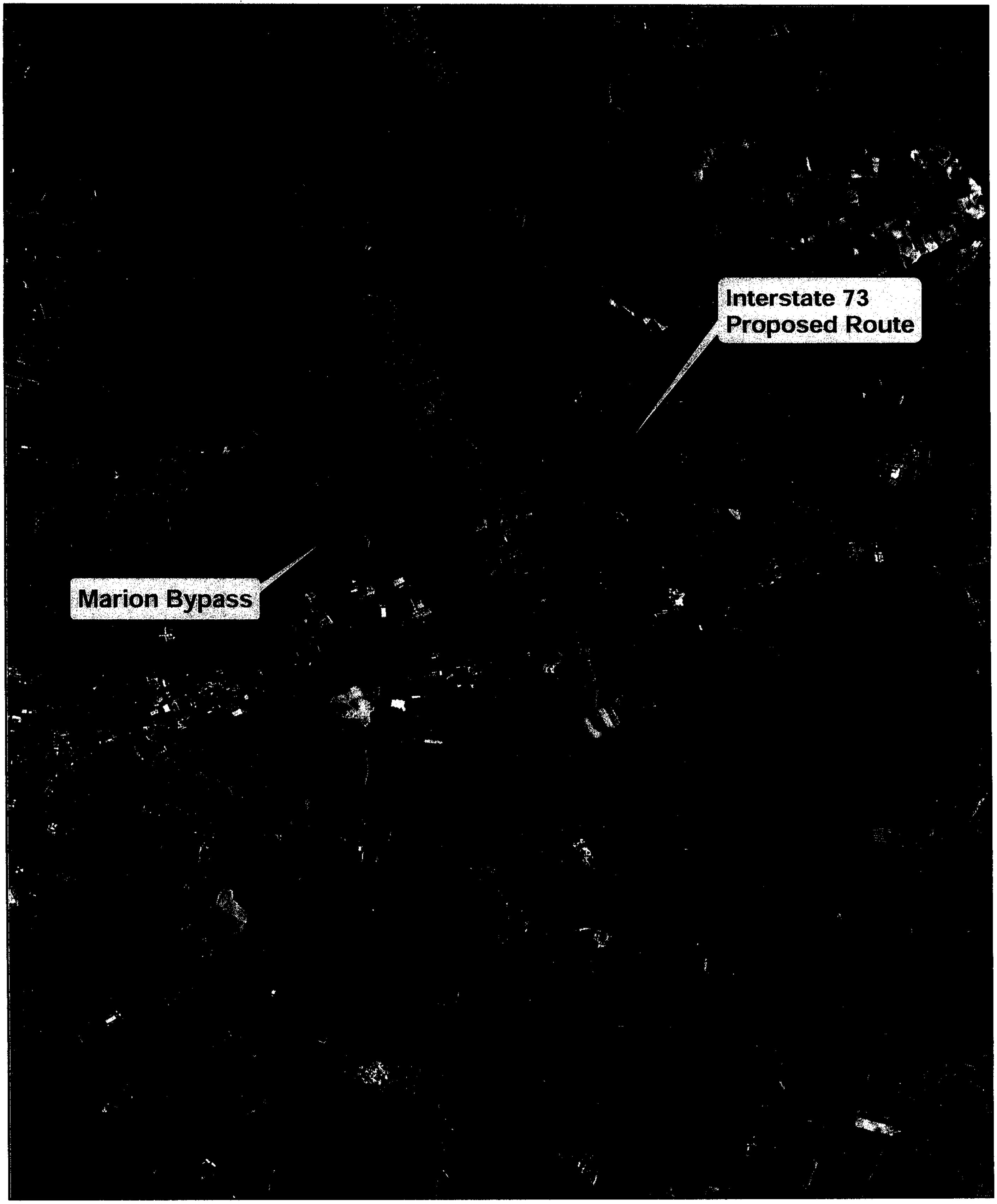


Figure 3 1 inch equals 0.90 miles

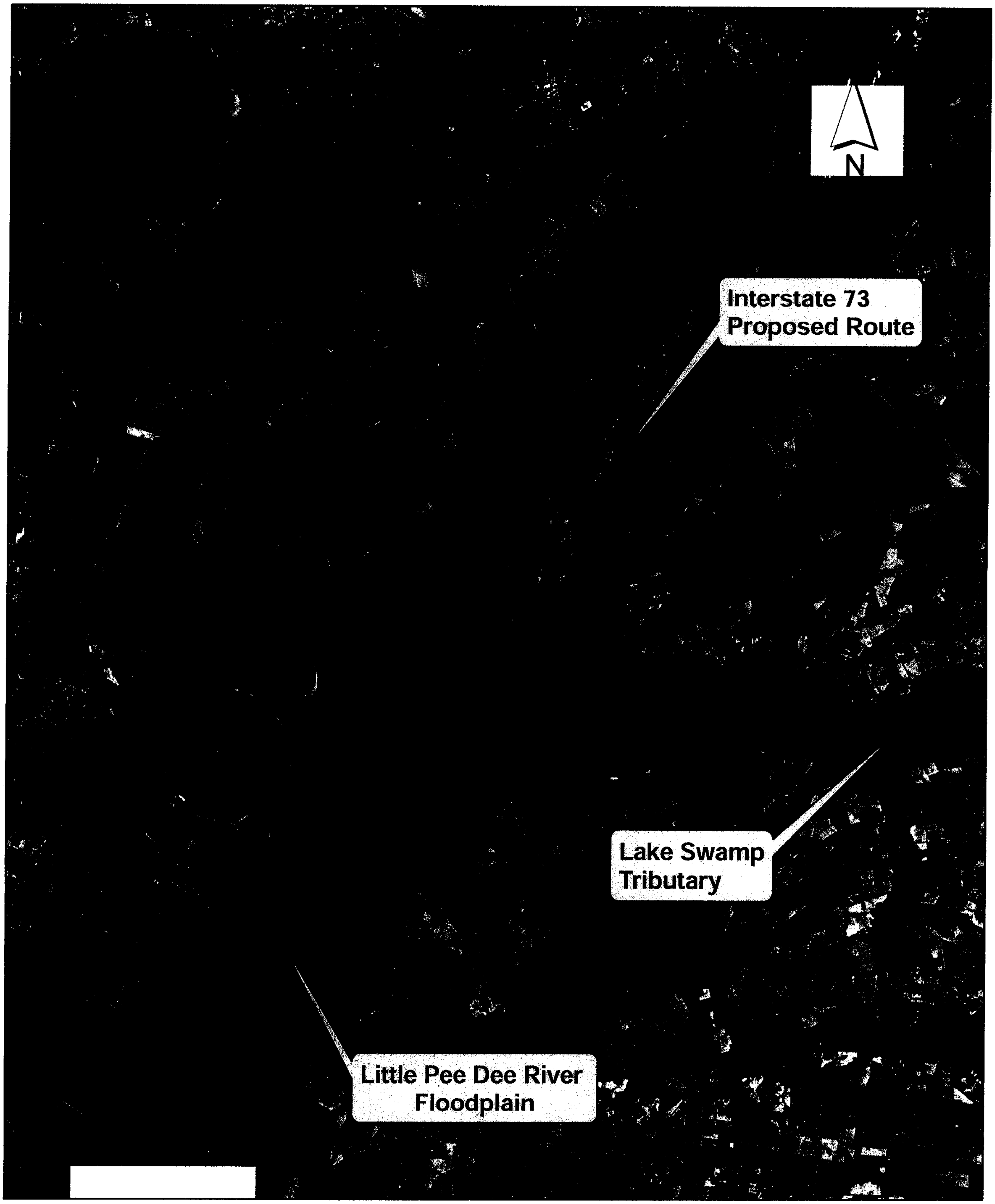


Figure 4 1 inch equals 1.25 miles

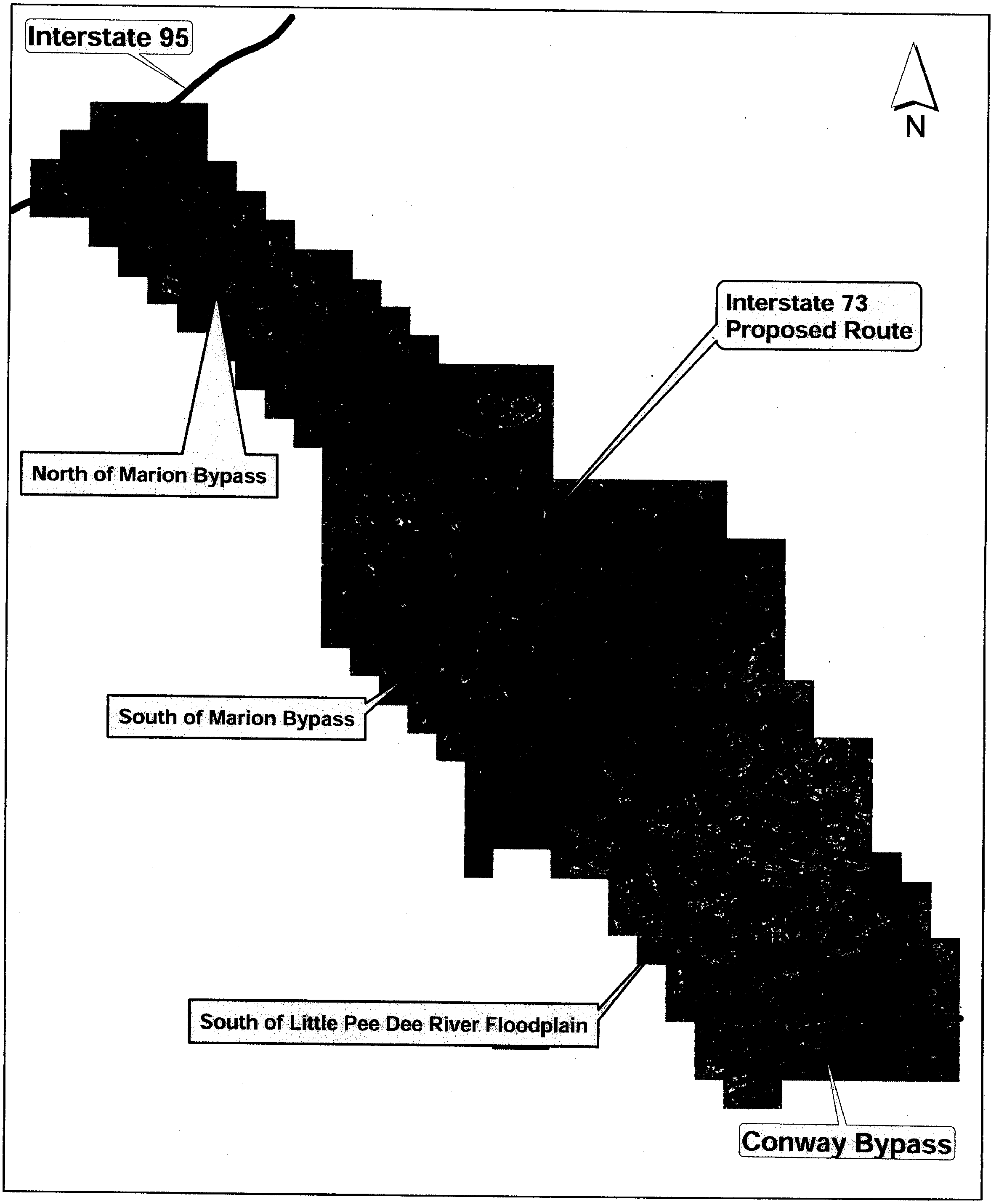


Figure 5

1 inch equals 3.95 miles

APPENDIX B

Curriculum Vitae

DONLEY E. KISNER
Curriculum Vitae

VICE PRESIDENT, ECOLOGICAL RESOURCE MAPPING

(b) (6)

[redacted]

PROFESSIONAL EXPERIENCE (Continued)

(b) (6)

[redacted]

(b) (6)

[redacted]

(b) (6)
[redacted]

An Economic Analysis of I-73 and the Grand Strand Expressway (GSX) Alternative

Upgrading SC 38/US 501 provides a realistic alternative to I-73 that improves access and facilitates tourism in the Grand Strand, creates thousands of jobs at one-tenth the cost, does not harm existing businesses along SC 38/US 501 and can be built in our lifetime.

Prepared by Miley & Associates INC. Columbia, SC

April 2012

Table of Contents

Executive Summary

Upgrading SC 38/ US 501, an existing major highway corridor between I-95 and SC 22, provides a realistic and preferable alternative to the proposed I-73 interstate. This existing corridor, referred to by proponents as the Grand Strand Expressway (GSX), offers substantial economic benefits at one-tenth of I-73's estimated $1.3 billion cost and would result in improved access to the Myrtle Beach tourism market. Upgrading the GSX would create thousands of jobs and save businesses along the existing routes. Furthermore, upgrades to SC 38/US 501 could be undertaken as funds are available, providing ongoing transportation utility and other economic benefits sooner than the proposed I-73.

This report is intended to help policy makers and citizens compare the economic benefits of the proposed GSX alternative versus those of the proposed I-73 interstate. The analysis focuses on the most important economic factors needed to make an informed decision on a transportation investment that will not only affect those in the region, but all South Carolinians.

This report reaches three key conclusions:

1. The GSX is a more cost effective use of state transportation resources. The GSX has a positive benefit/cost ratio while I-73 does not
2. The GSX provides potential economic benefits to rural counties without displacing local businesses
3. South Carolina can improve access to the Myrtle Beach area, without spending $1 billion that could go to other transportation infrastructure projects with greater economic benefits than the proposed I-73 interstate

Executive Summary
(continued)

1. The Grand Strand Expressway (GSX) has a positive benefit/cost (B/C) ratio, I-73 does not.

Benefit Cost Analysis

- ***B/C Ratio of GSX = 1.4.***
- ***B/C Ratio of I-73 = 0.26.***
- ***The GSX alternative has significant travel cost savings at one-tenth the cost of I-73.***

Upgrading the GSX between I-95 and SC 22 has been shown to be a viable transportation alternative to the proposed I-73 interstate. It is estimated that the GSX alternative will cost approximately $150 million.[1] Like the construction of I-73, the GSX alternative creates jobs in its construction phase and facilitates tourism along the Grand Strand at one-tenth the cost of the proposed I-73.

This report utilizes the TREDIS modeling system, the premier transportation/economic modeling system widely used by state departments of transportation throughout the country.[2] TREDIS clearly demonstrates that the benefit/cost (B/C) ratio of the GSX is far better than that of I-73. The B/C ratio of the GSX is 1.4 while the B/C ratio of I-73 is 0.26 (well below 1.0).

It is important to note that traditional public finance decision criteria recommend that if a project's B/C ratio is less than 1.0, the project is not in the public's best interest. In business and government, investing in a project with B/C ratio less than 1.0 would be analogous to investing in a project knowing that the project would lose money.

TREDIS is specifically designed to estimate transportation impacts. In comparison, the report by Chmura Economics & Analytics titled, "Economic Impact of I-73 in South Carolina," utilized the IMPLAN modeling system.[3] IMPLAN is appropriate for estimating some impact scenarios, but it is a simplistic methodology for evaluating transportation systems. TREDIS incorporates the IMPLAN model, but builds and expands on it to make it more appropriate for transportation applications. TREDIS is an integrated framework for transportation planning and project assessment designed to cover a wide range of applications – from looking at the benefit/cost impact of a single transportation investment to analyzing the macroeconomic impacts of alternative long-range plans such as the I-73 proposal.

Executive Summary
(continued)

2. GSX provides potential economic benefits to rural counties without displacing local businesses

- ***The GSX is estimated to create and maintain 22,000 jobs (3,200 construction and 18,800 other --- and sooner than I-73).***
- ***The GSX will not displace jobs – I-73 will displace jobs along existing routes.***
- ***New interstates often do not help rural areas -- the I-95 corridor is an example.***

The assertion that I-73 will have widespread economic development benefits is largely based on the report by Chmura Economics which estimated there would be thousands of jobs created as a result of the road's construction as of the year 2030. These jobs would be generated primarily from two sources: the physical construction of the road and the improved access to the Grand Strand area from the proposed highway. Most of these jobs are projected to be 20 years in the future. Chmura estimates that approximately 30 percent more jobs will be created by I-73 than those estimated in this study for the GSX. These jobs, however, come at 10 times the cost of GSX. It is also important to note that the additional jobs relate to construction rather than adding permanent economic benefits to the Grand Strand and the rural counties along the proposed route. This report concludes that the GSX alternative is also a substantial job creator. And these jobs could be created much sooner due to the smaller investment required.

It has been suggested that I-73 will benefit the rural areas along the road's route during and after completion. However, this conclusion is not substantiated in the Chmura report or other existing empirical research. The areas along the proposed routes rank relatively low in terms of economic development and per capita income. Historically, interstate construction in South Carolina has not resulted in rural economic prosperity. One only has to look at the counties along I-95, from Dillon to Jasper, to see how little an interstate benefits rural communities along its route. For example, of the 13 South Carolina counties adjacent to I-95 only Dorchester and Jasper had unemployment rates lower than the state average of 9.5 percent in January 2012. The unemployment rate in the other 11 counties averaged 14.0 percent, 4.5 percentage points higher than the state's average.

With fully controlled access highways, such as the proposed I-73, business opportunities are limited to major interchanges. Due to the sudden increase in the value of land at these interchanges, the majority of businesses are large, national operations – not small or locally owned businesses. The upgrading of GSX would maintain the viability of businesses adjacent to the current SC 38/US 501.

Executive Summary
(continued)

This report also raises questions regarding the validity of the Chmura assumption that the jobs created will be **net** new jobs. That is, many of the jobs estimated by the Chmura study may just replace jobs that could be lost if I-73 were to be completed. There is precedent for this job replacement phenomenon in South Carolina and elsewhere – the decline in jobs and establishments along Highway 301 and other routes when I-95 was constructed.

Even if all the jobs lost due to the construction of I-73 were to be replaced with new jobs along the interstate, the displacement would hurt local communities. Many of the businesses along the GSX route are small and locally owned businesses that would be negatively impacted with traffic being re-routed to I-73. It is unlikely that many of these small businesses would survive or have the financial resources to relocate to an I-73 interchange.

Executive Summary
(continued)

3. South Carolina can improve access to the Myrtle Beach area, without spending $1 billion that could go to other transportation infrastructure projects with greater economic benefits than the proposed I-73 interstate.

- ***South Carolina does not have the funds available for I-73 and will not for the foreseeable future.***
- ***Other critical infrastructure needs exist in South Carolina that could provide greater economic benefits.***
- ***The construction of I-73 could divert funds away from critical infrastructure needs east of Conway and SC 22.***
- ***SC DOT would need to spend an additional $130 million to maintain the proposed I-73 over a 30-year period.***

In the current environment of scarce highway construction funds, South Carolina needs to carefully consider the construction of I-73 in relation to all of the state's highway infrastructure needs. While the $1.3 billion for I-73 has not been secured, if it was, it could supplant other state transportation infrastructure needs that are a higher priority – especially since improved access to the Grand Strand could be achieved by the GSX at one-tenth the cost. For example, improvements to I-26 and I-85 would most likely provide greater economic benefits to the State than I-73. Road improvements to manufacturing areas have been shown to have more benefits than non-manufacturing areas. The construction jobs that would be created by building I-73 would be generated in the state no matter where $1.3 billion worth of road construction occurs.

Finally, the benefits outlined in the Chmura report do not address the increased maintenance costs of a new interstate. The current costs to maintain SC 38/US 501 would continue if I-73 were to be completed; requiring the state to fund maintenance costs for both routes. Based on SC DOT data, it is estimated that maintenance costs of the new interstate would be more than $4.3 million annually. Over a 30-year period I-73 maintenance costs would exceed $130 million.[4]

Executive Summary

(continued)

Summary and Conclusions

In summary, this report reaches three key conclusions:

- ***The GSX is a more cost effective use of state transportation resources. The GSX has a positive benefit/cost ratio while I-73 does not.***
- ***The GSX provides potential economic benefits to rural counties without displacing local businesses.***
- ***South Carolina can improve access to the Myrtle Beach area, without spending $1 billion that could go to other transportation infrastructure projects with greater economic benefits than the proposed I-73 interstate.***

As a result of these findings, we conclude that the GSX (upgrading SC 38/US 501 from I-95 to SC 22) alternative is clearly superior to the I-73 proposal for South Carolina taxpayers.

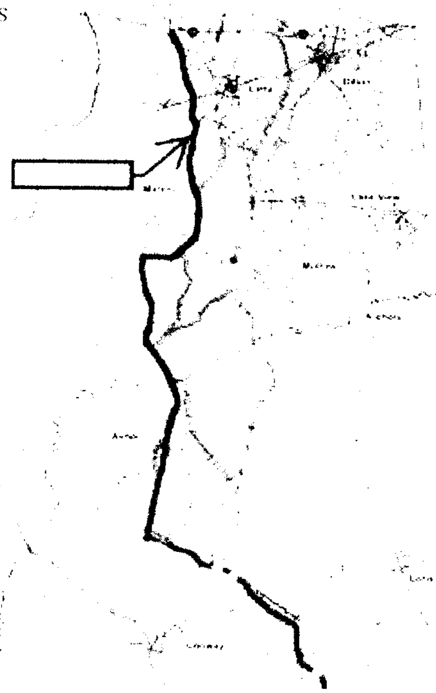
1. Introduction

Transportation infrastructure networks are an integral part of any economic system. Without them we could not easily move goods and/or people -- and commerce would be restricted largely to local trade. Efficient transportation systems expand internal and external trade opportunities, increase labor mobility and enhance the economy's production capacity and, in general, improve the economic welfare of residents. They also provide social and economic opportunities.

The economy is affected by the efficiency of these transportation corridors, such as SC 38/ US 501 and SC 22 in the Pee Dee region. To analyze the economic impact of a transportation improvement, such as upgrading South Carolina Highway 38/US Highway 501, referred to by proponents as the Grand Strand Expressway (GSX), to the new alignment I-73, the examination depends largely on traffic information. This analysis uses the traffic information to determine the benefits of reduced travel time compared with the costs of new construction and/or road improvements. These comparisons are an important way to help policy makers determine what course of action provides the best value (i.e., benefits vs. costs) for those who use the transportation facility, and those who pay for it.

The South Carolina Department of Transportation (SCDOT) and Federal Highway Administration (FHWA) propose building I-73 on new alignment in northeastern South Carolina. This study analyzes the transportation and economic impact study of the proposed I-73 interstate commissioned by the Northeastern Strategic Alliance (NESA), expanding the analysis to include interchange clustering and transportation efficiency, which will provide additional information and insight to policy makers.

This study also looks at the one-time impact of highway construction and efficiency/ productivity gains over the life of the highway. Our overall goal is to determine which alternative, GSX, I-73 or no-build, generates the most value (i.e., travel efficiency) for the least cost to taxpayers. We note that whether the proposed I-73 project, the SC 38/US 501



upgrade, or a no-build option is selected, the Myrtle Beach area will see equal non-transportation related economic impacts.

The South Carolina Department of Transportation (SCDOT), in association with the Federal Highway Administration (FHWA), proposes to build I-73 on new alignment in northeastern South Carolina. SCDOT defines the study area as extending "southeast from I-95, bounded to the northeast by the North Carolina/ South Carolina state line, to the southeast by U.S. Route 17, and to the southwest by

1. Introduction
(continued)

the eastern edge of the Great Pee Dee River floodplain, U.S. Route 378, and U.S. Route 501. The project would extend from I-95 in Dillon County, through Marion County and into Horry County. It would terminate at S.C. Route 22 in Horry County, which would be made part of I-73."(FEDERAL HIGHWAY ADMINISTRATION, 2009)

We analyzed two studies of the proposed I-73; the Chmura Economics & Analytics *Economic Impact of I-73 in South Carolina and the Interstate 73 Final Environmental Impact Statement from I-95 to the Myrtle Beach Region (FEIS).* (FEDERAL HIGHWAY ADMINISTRATION, 2009). Five primary highway impacts are generally considered in this kind of analysis: land use, tourism, spillover effects (interchange clustering) and transportation efficiency impacts. In this study, we did not analyze or include impacts from changes in land use in the year 2030, such as the development of distribution centers. As the Chmura study states, "Land use is highly speculative and development is unlikely without additional incentives or expenses to the region."[5]

Because the proposed I-73 corridor and GSX both terminate at SC 22, well northwest of the Grand Strand area, this leads us to conclude there will be no substantive variation in tourism impacts in the Myrtle Beach area among the alternatives. It is very doubtful that the proposed I-73 will be a primary factor in future Myrtle Beach tourism. Rather, demographics, the national economy, affordable housing, and the environment – including beach quality (Klein & Osleeb, 2010), sea level rise and tropical storms – will more likely shape the future of most coastal economies, including the Grand Strand. Finally, tax analysis is greatly dependent on the sources of financing. However, since the sources of financing have not been determined at this time, no tax analysis is included in this study.

In this study, we did not analyze or include impacts from changes in land use in the year 2030, such as the development of distribution centers. As the Chmura study states, "Land use is highly speculative and development is unlikely without additional incentives or expenses to the region."[5]

2. Transportation Analysis of South Carolina 38/US Highway 501

Travel Efficiency: TREDIS

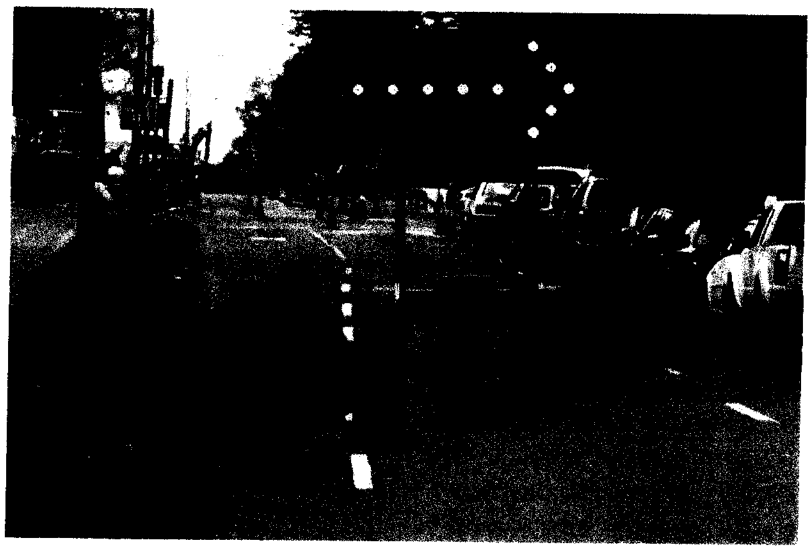
Transportation efficiency in this study is estimated using the Transportation Economic Development Impact System (TREDIS) rather than the "analogy" approach used by Chmura.

TREDIS is specifically designed to estimate transportation impacts. In comparison, the report by Chmura Economics & Analytics, "Economic Impact of I-73 in South Carolina," utilized the IMPLAN modeling system.[6] IMPLAN is appropriate for estimating some impact scenarios, but it is a simplistic methodology for evaluating transportation systems. In fact, the TREDIS model incorporates the IMPLAN model, but builds and expands on that model to make it more appropriate for transportation applications. TREDIS is an integrated framework for transportation planning and project assessment designed to cover a wide range of applications – from looking at the benefit/cost impact of a single transportation investment to analyzing the macroeconomic impacts of alternative long-range plans such as the I-73 proposal.

TABLE 1 Average Annual Daily Traffic

Station Number	2009	2030 Projected*
193	9300	19,530
195	6900	14,490
199	5800	12,180
167	9900	20,790
169	8100	17,010
191	16100	33,810
195	16200	34,020
149	17600	36,960
Aynor**	17600	36,960
151	24200	50,820

*Multiplier 2.1 **Aynor estimated



For each segment of the proposed I-73, inputs including trips, vehicle miles traveled (VMT), and vehicle hours traveled (VHT) are sourced from the FEIS, calculated using standard Highway Capacity Manual methodology and then input into TREDIS. Segment data is based on average annual daily traffic (AADT) for 2030 for passenger (personal/recreational) vehicles. (See Table 1)

2. Transportation Analysis of South Carolina 38/US Highway 501

(continued)

Benefit/Cost Analysis

In this section, we compare the proposed I-73 Build with the SC 38/US 501 Build (Upgrade) and a No Build scenario. The I-73 Build returned a benefit/cost ratio of 0.26, while the SC 38/US 501 Build ratio was 1.4.[7]

It is important to note that traditional public finance decision criteria recommend that if a project's B/C ratio is less than 1.0, the project is not in the public's best interest. In business and government, investing in a project with B/C ratio less than 1.0 would be analogous to investing in a project knowing that the project would lose money.

Our analysis clearly demonstrates that the GSX project provides a significant benefit for dollars invested, while the I-73 project falls woefully short because of its high construction price. It has only a small incremental value compared with a no-build scenario.

The Chmura report suggests that a payback for the proposed I-73 project is four years. The TREDIS analysis shows no evidence of a payback period at all – the opposite conclusion.

The SC 38/US 501 upgrade on the other hand, has a net present value (NPV) of a $51 million benefit while the I-73 project results in a ($704 million) deficit to the public. I-73 provides a 32 percent higher travel cost savings, $29.5 million versus $22 million, but at ten times the cost. Based on transportation efficiency savings, SC 38/US 501 has a projected payback in year 2029, while I-73 has no projected payback period at all.

Our analysis clearly demonstrates that the GSX project provides a significant benefit for dollars invested, while the I-73 project falls woefully short because of its high construction price. It has only a small incremental value compared with a no-build scenario.

2. Transportation Analysis of South Carolina 38/US Highway 501 (continued)

Sensitivity Analysis of Benefit/Cost Analysis

Benefit/cost analysis is significantly influenced in this model by construction cost and time saving. The high cost of construction requires an increased benefit to the public in order to result in a cost/benefit ratio greater than one. Because of the projected high speeds of SC 38/US 501, even without building new infrastructure (using Final Environmental Impact Statement (FEIS) inputs), the difference between build and no-build efficiency is minimal. Thus it does not provide a benefit to the public based on increased speed. The FEIS states:

> Therefore, while all Build Alternatives are projected to have a considerable positive economic impact on the region, the magnitude of that impact between alternatives is too similar for economic development to be the deciding factor in determining which alternative is preferred. (FEDERAL HIGHWAY ADMINISTRATION, 2009).

Further analysis reveals three critical bottlenecks in the SC 38/US 501 alternative. By adjusting the intersection delay at the I-95/SC 38 junction, the City of Aynor intersections, and the US 501/SC 22 merger, we evaluated the speed impact on the benefit/cost relationship.

The City of Aynor intersections and US 501/SC 22 interchange (merge from two lanes to one) have the greatest influence on the system traffic speed based on Vehicle Miles Traveled (VMT) and Vehicle Hours Traveled (VHT), and the peak travel multiplier from the FEIS.[8] Our sensitivity analysis adjusted speed inputs and Annual Average Daily Traffic (AADT) over these segments. A positive benefit/cost ratio for the SC 38/US 501 alternative increases as the traffic slows over a four-mile segment for 90 days, with an average speed of below 39 mph and additional intersection delays of 12 minutes. These are in line with projected FEIS case scenarios for 2030. Because of the high cost of building I-73, the project will not have a positive benefit/cost ratio regardless of FEIS scenarios or more extreme conditions that could be applied and modeled to a no build scenario for SC 38/US 501.

Traffic inputs are calculated using the standard Highway Capacity Manual (HCM) method for each segment (See Methodology Section for more detail on HCM). Total for trips, VMT and VHT are then totaled for each alternative. The no-build alternative includes intersection and bottleneck penalties. They are removed in the improved SC 38/US 501 and the I-73 options. Reviewing the 42-mile segment, no build is estimated to yield an average speed of 36 miles per hour.[9] Improved SC 38/US 501 speed is 54 mph and I-73 speed is 65 mph for the three peak travel months, June-August 2030. It is important to keep in mind that during non-peak travel, automobiles are expected to flow at free flow speeds (FFS), even in a no build scenario for 2030. See Table 2.

TABLE 2 Traffic Inputs

Alternative	Trips	VMT	VHT	Average Speed MPH
No-Build 2030	25,728,300	106,133,355	2,946,372	36
Improve 38/501 2030	25,728,300	106,133,355	1,969,448	54
I-73 Build 2030	25,728,300	106,133,355	1,632,821	65

2. Transportation Analysis of South Carolina 38/US Highway 501
(continued)

Travel Efficiency: Myrtle Beach

Travel efficiency for the proposed I-73 is compared with the SC 38/US 501 upgrade alternative. Neither project alternative affects the Myrtle Beach area or other economic development analysis completed for the region. The Grand Strand Area Transportation Study (GSATS) data was not used in this project's research, primarily because both the proposed I-73 and GSX terminate at SC 22. The FEIS states:

> Reducing existing traffic congestion on roads accessing the Myrtle Beach region is a secondary need of the project. As a measure of the effectiveness of the proposed facility to relieve local traffic congestion, the vehicle hours traveled (VHT) for the average annual daily traffic (AADT) on the project study area roadway network, minus the Grand Strand Area Transportation Study (GSATS) area, was determined for each alternative. The GSATS area was removed because of the different roadway capacities and daily traffic criterion used in the GSATS model. The roadway capacities are not set equivalent to the actual roadway capacity, and the daily traffic criterion is for peak daily, not average annual daily traffic. (FEDERAL HIGHWAY ADMINISTRATION, 2009)

The fact that all Myrtle Beach traffic congestion is excluded from the analysis and the previous studies is important. Neither the I-73 nor SC 38/US 501 alternative affect the coastal traffic issues east of SC 22. As the following figure indicates, the areas of severe traffic congestion (indicated by the yellow and red areas) are all east of SC 22.

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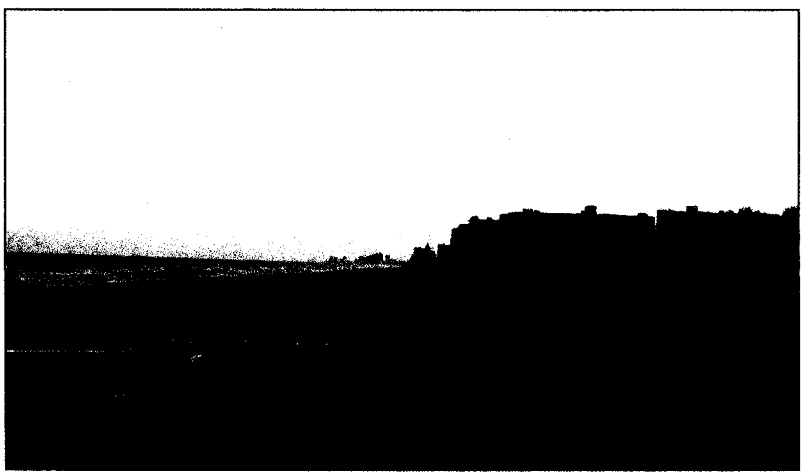

2. Transportation Analysis of South Carolina 38/US Highway 501
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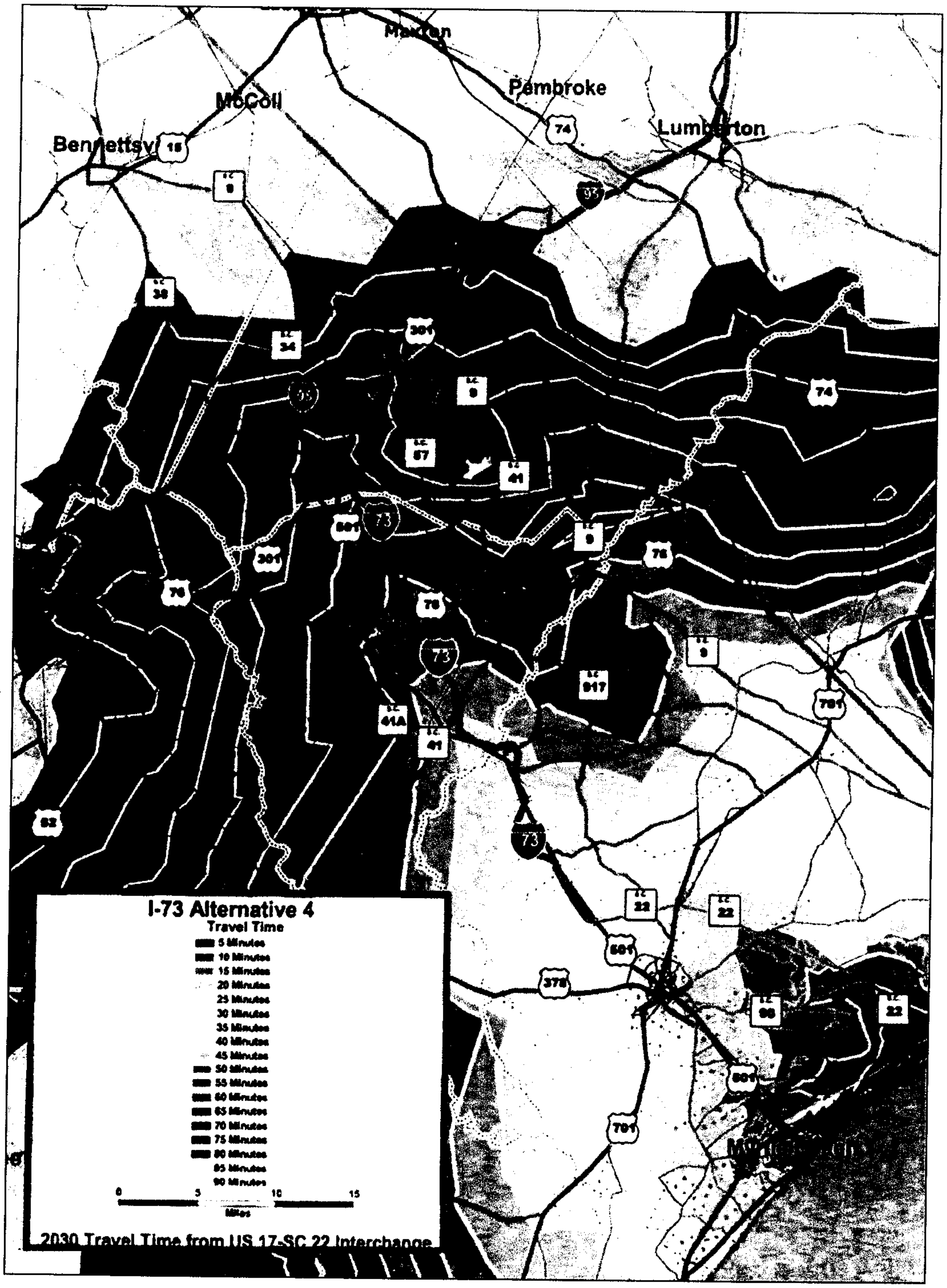

3. Economic Impacts of South Carolina 38/US Highway 501

Construction Impacts

Construction projects provide relatively large economic benefits to any region. Most construction projects return those benefits to the local region, and in the case of large highway projects, to the state, unless contractors are locally based. This would apply to construction of I-73 or the upgrading of SC 38/US 501.

As with any construction activity, the more dollars spent, the larger the impacts on the economy will be. In the case of the proposed I-73, we have assumed an estimated $1.3 billion in construction impacts.[10]

The total economic impact, including direct, indirect, and induced spending is estimated at $1.945 billion, or a multiplier of 1.5 above the initial project cost. Over the five-year life of the project, employment is projected at 3,160 per year. These employment impacts, unfortunately, provide little benefit to the community when the project is finished.

Alternatively, the SC 38/US 501 upgrade costs are estimated to be $147 million.[11] Total direct, indirect, and induced impacts are estimated to be more than $219 million -- also a multiplier of 1.5. Total employment over the life of the project is expected at 2,142, a 30 percent lower number but achieved at one-tenth the cost. These impacts also are in line with the positive benefits they provide to the local taxpayer. However, there is an opportunity with SC 38/US 501 to target construction spending on critical bottlenecks providing an immediate economic impact while allowing this highway to continue to be used and to continue to serve the community now, as opposed to waiting until 2030.

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3. Economic Impacts of South Carolina 38/US Highway 501

(continued)

Spillover Impacts of the Proposed I-73

Spillover effects are analyzed by evaluating current and empirical transportation research. The literature search was narrowed to a meta-analysis of documents that provided empirical research about the economic impacts of transportation infrastructure projects. This analysis provides the foundation of transportation economic development research into both transportation efficiency, which in this study is measured with TREDIS and transportation spillover effects.[12]

Spillover effects are economic activities uncaptured in core activities and frequently have unintended consequences beyond the primary event. Spillover effects can be measured using the spillover coefficient (Goetz, Deller, & Harris, 2009) and can be both positive and negative.[13] Early studies suggested that larger-than-average inter-regional (non-local) positive spillover coefficients tended to be either in the transportation or utility sectors (Goetz, Deller, & Harris, 2009). However, more recent studies have shown that transportation and other public capital can and do have negative spillovers in local economies (Baird, 2005).

Spillover effects are important to transportation analysis since they can negatively affect local communities. New infrastructure added in an adjacent region creates negative spillovers, most notably in the service industry sectors. The net result is that new highway interchanges outside a local region see an increase in retail, while the local community sees a decrease because the new infrastructure draws business away from the older highway.

A prime example of these negative spillover effects in South Carolina are the negative impacts of I-95 on the communities along US 301 in Allendale, Bamberg and Hampton counties. These communities and businesses once thrived due to continuous traffic, but lost commerce when traffic was shifted from US 301 to I-95.

It has been suggested that the proposed I-73 will benefit the rural areas along the road's route during and after completion. However, this conclusion is not substantiated in the Chmura report or other existing empirical research. The Chmura study suggests that, "the most direct and visible new jobs created by I-73 will be in the businesses along I-73 serving motorists." Chmura states that they use a "model-by-analogy" approach to determine this impact. However, empirical research states that these new jobs actually replace existing jobs from adjacent areas "leaving the net level of economic activity unchanged in non-metropolitan areas" (Baird, 2005).

A prime example of these negative spillover effects in South Carolina are the negative impacts of I-95 on the communities along US 301 in Allendale, Bamberg and Hampton counties. These communities and businesses once thrived due to continuous traffic, but lost commerce when traffic was shifted from US 301 to I-95.

3. Economic Impacts of South Carolina 38/US Highway 501
(continued)

TABLE 3 Labor Force and Unemployment - I-95 Corridor

County	Labor Force	Employment	Unemployed	Unemployment Rate
Bamberg County	6,063	5,157	906	14.9%
Clarendon County	12,313	10,485	1,828	14.8%
Colleton County	16,944	14,818	2,126	12.5%
Darlington County	30,337	27,194	3,143	10.4%
Dillon County	12,973	11,095	1,878	14.5%
Dorchester County	67,533	62,605	4,928	7.3%
Florence County	62,659	56,131	6,528	10.4%
Hampton County	7,578	6,611	967	12.8%
Jasper County	10,218	9,344	874	8.6%
Lee County	8,113	7,063	1,050	12.9%
Marlboro County	11,362	9,496	1,866	16.4%
Orangeburg County	40,280	34,705	5,575	13.8%
Sumter County	44,164	39,454	4,710	10.7%
South Carolina	2,119,571	1,917,507	202,064	9.5%

Source: South Carolina Department of Employment and Workforce, March 2012

Further compromising the Chmura study is the fact that those spillover effects are larger than the benefit of the new highway network itself. Therefore, the new jobs and related impacts for interchange clustering are, in fact, a transfer of services and jobs from the local community to the new infrastructure. However the result is that slightly fewer jobs exist because the businesses that relocate are generally more modern and more productive. This phenomenon is reported in a number of studies, most recently by (Chandra, 2000). Finally, new non-local highway infrastructure actually exports local dollars to national firms, allowing them to invest new money (because they are more productive than local firms) in newly created non-local infrastructure in adjacent localities. Although this is a win for larger business chains (primarily service related firms) it is a clear loss for the local community.

One only has to look at the counties along I-95, from Dillon to Jasper, to see how little an interstate benefits rural communities along its route. As seen in Table 3, of the 13 South Carolina counties adjacent to I-95 only two (Dorchester and Jasper) had unemployment rates lower than the state average of 9.5 percent in January 2012. The unemployment rate in the other 11 counties averaged 14.0 percent, 4.5 percentage points higher than the state's average.

With limited access highways, such as the proposed I-73, business opportunities are limited to major interchanges. Due to the sudden increase in land values along these interchanges, the majority of businesses are large, national operations – not owned by small, local businesses. Upgrading the GSX would maintain the viability of businesses adjacent to the current SC 38/US 501.

3. Economic Impacts of South Carolina 38/US Highway 501
(continued)

Many of the businesses along the GSX route are locally owned small businesses that would be negatively impacted by the loss of traffic being re-routed to I-73 and away from the GSX. It is unlikely that many of these small businesses would survive or have the financial resources to relocate to an I-73 interchange.

In addition, this report raises questions regarding the validity of the Chmura assumption that the jobs created will be **net** new jobs. That is, many of the jobs estimated by the Chmura study may simply replace jobs that could be lost if I-73 were built elsewhere. There is precedent for this job replacement phenomenon in South Carolina. There was a decline in jobs and establishments along Highway 301 and other routes when I-95 was constructed. Even if all the jobs lost due to the construction of I-73 were to be replaced with new jobs along the interstate, the displacement would hurt local communities. Many of the businesses along the GSX route are locally owned small businesses that would be negatively impacted by the loss of traffic being re-routed to I-73 and away from the GSX. It is unlikely that many of these small businesses would survive or have the financial resources to relocate to an I-73 interchange.

3. Economic Impacts of South Carolina 38/US Highway 501
(continued)

Spillover Effects SC 38/US 501

Spillover effects are minimized when existing infrastructure is upgraded rather than replaced. Local companies are able to stay put and compete when upgrades are built with new investment developing an appropriate level of increased demand near local interchanges. With local infrastructure upgrades, local communities also capture economic impacts of both the construction phase, which gives an immediate boost to the economy, and the operational impacts when the highway is up and running. The advantages of upgrading SC 38/US 501 would be delivered to the local community in three ways: 1) maintaining local employment, 2) capturing ongoing economic impacts from increased efficiency of the new infrastructure (especially for manufacturing), and 3) capturing locally owned and operated businesses and proprietary income (value added), which would result in maintaining the local tax structure.

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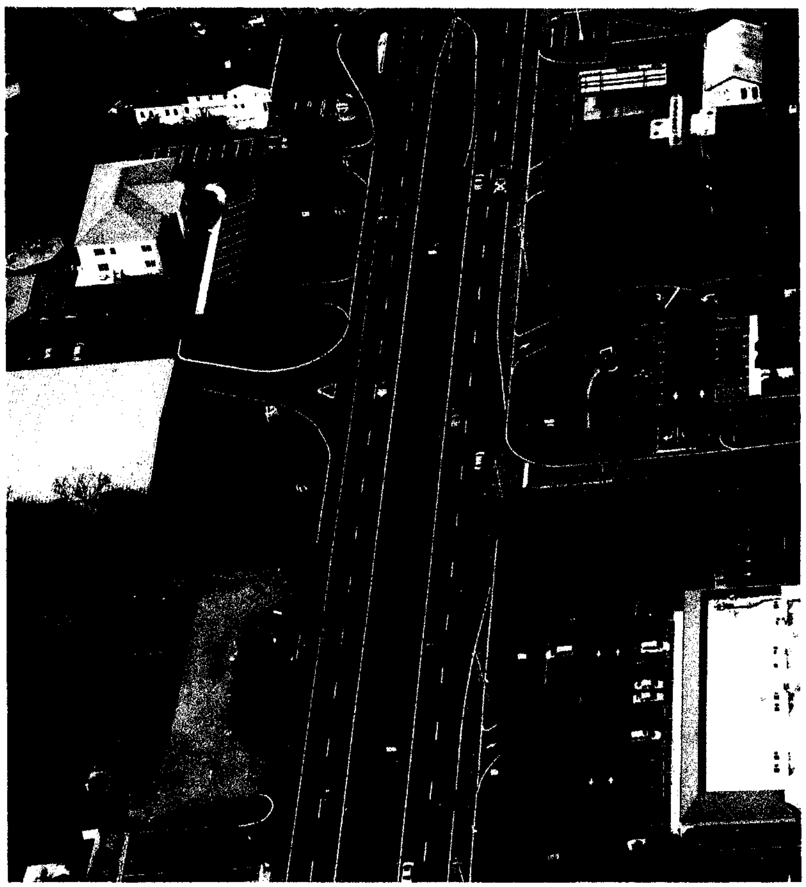

4. Funding Issues Related to the Proposed I-73

As scarce as highway construction funds are today, the state needs to carefully consider the construction of I-73 in relation to all of South Carolina's highway infrastructure needs. While the funds for I-73 have not been secured, if the State were able to secure the $1.3 billion or more of funding, there are other transportation infrastructure needs that are likely to provide greater economic benefit – especially since the Grand Strand's needs could be met by the GSX at one-tenth the cost. The safety and congestion issues on I-26 are one such priority. In addition, the need for improvements to I-26 is expected to increase once the Port of Charleston is deepened. The construction jobs that would be created by building I-73 would be generated no matter where in South Carolina the $1.3 billion worth of new roads were built.

According to the SCDOT long range plan, there are current and future needs in South Carolina that will not be met. For example, the SCDOT estimates that the state needs an additional $40 billion to fund its long-term needs. However, only $11 billion in funding is available, according to SCDOT.[14]

More recently, SCDOT has stated publically that there are critical needs in South Carolina that are currently going unmet. For example, the SCDOT estimates that the state needs an **additional** $340 million today to increase the interstate system's capacity to "good", $440 million to increase the primary road system capacity to "good" and another $540 million to increase the capacity of the secondary road system to "good". When bridge maintenance and other needs are included the SCDOT estimates the cost at $1.5 billion per year in additional funds. It would require $500 million annually to raise the capacity to "fair".

Finally, the current discussion of I-73 has not adequately addressed the increased maintenance costs of a new interstate highway. The current costs to maintain SC 38/ US 501 would continue and not stop once I-73 is completed. The state would have to fund maintenance costs for both routes. Based on SCDOT data, it is estimated that annual maintenance costs of the new interstate would be more than $4.3 million. Over the next 30 years this would exceed more than $130 million, adding millions to the statewide system preservation deficit.

5. Conclusions and Summary

This report evaluates alternatives to the proposed I-73, a new four-lane expressway proposed from the southern terminus of I-73 in North Carolina near Rockingham, and continuing through South Carolina, ending at SC 22 (an existing four lane highway). Operation analysis for an updated traffic system is estimated in the year 2030. This analysis specifically focuses on the I-73 corridor and SC 38/US 501 from I-95 to SC 22.

In this study we looked at the one-time impact of highway construction and efficiency/productivity gains resulting in improved infrastructure over the life of the highway. The goal of this analysis is to determine which alternative generates the most value (i.e., travel efficiency) for the least cost to taxpayers. We note that whether the I-73 project, the SC 38/US 501 upgrade, or a no-build option is selected, the Myrtle Beach area will see equal non-transportation related economic impacts.

While each build scenario gains in traffic efficiencies, only the SC 38/US 501 upgrade results in a positive net present value (NPV). Stated another way, only the SC 38/US 501 alternative would provide a positive return to the taxpayers on their infrastructure investment.

...only the SC 38/US 501 upgrade results in a positive net present value (NPV). Stated another way, only the SC 38/US 501 alternative would provide a positive return to the taxpayers on their infrastructure investment.

The GSX alternative would produce a net $51 million traveler benefit, while the I-73 project would produce a $704 million travel deficit. The SC 38/US 501 project could also benefit local businesses, but both I-73 and the SC 38/US 501 upgrade would provide travel efficiency gains. Upgrading SC 38/US 501 allows targeted construction spending on critical bottlenecks to happen sooner which would provide benefits to the community earlier than the proposed I-73.

Although speeds are slightly lower with the SC 38/US 501 alternative during the three summer months, the SC 38/US 501 alternative provides five significant benefits over the proposed I-73 corridor for passenger (personal/recreation) vehicles:

- GSX offers a significantly higher benefit/cost ratio of 1.4 compared with the I-73 benefit/cost ratio of .26. (The general decision rule is that projects with B/C ratios greater than 1.0 should be undertaken, while those with B/C ratios of less than 1.0 are not undertaken).
- The I-73 travel cost savings is $29.5 million compared to the SC 38/US 501 travel cost saving of $22 million. However, **the SC 38/US 501 savings comes at one-tenth the cost of building I-73.**
- Upgrading SC 38/US 501 maintains the viability of current businesses near and adjacent to the corridor, eliminating the need for relocations or lost business due to the diversion of traffic to I-73.

5. Conclusions and Summary
(continued)

- Based on travel efficiency savings, the SC 38/ US 501 upgrade has a projected payback in year 2029, while I-73 has no projected payback period.

- SC 38/US 501's economic impacts will enhance productivity for local manufacturers and distributors while having no effect on the Grand Stand's tourism economy as reported in other economic analyses, since it would terminate, like I-73, at SC 22, well north and west of Myrtle Beach.

In summary, this report reaches three key conclusions:

- SC 38/US 501, the GSX alternative, is a more effective use of state transportation resources. The GSX has a positive benefit/cost ratio while I-73 does not.

- The GSX alternative provides potential economic benefits to rural counties without displacing local businesses.

- By upgrading the SC 38/ US 501, South Carolina can improve access to the Myrtle Beach area without spending $1 billion that could go to other transportation infrastructure needs that provide greater economic benefits.

By upgrading the SC 38/ US 501, South Carolina can improve access to the Myrtle Beach area without spending $1 billion that could go to other transportation infrastructure needs that provide greater economic benefits.

As a result of these findings, we conclude that the GSX (upgrading SC 38/US 501 from I-95 to SC 22) alternative is clearly superior to the I-73 proposal for South Carolina taxpayers.

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Endnotes

1 *The Grand Strand Expressway: An Alternative to the Proposed I-73 to Myrtle Beach, South Carolina* Norwich:Smart Mobility, March 2011
2 TREDIS is the Transportation Economic Development Impact System, 2010
3 Chmura Economics & Analytics, *Economic Impact of I-73 in South Carolina*. Florence: Northeastern Strategic Alliance, May 2011.
4 SC DOT data based on Maintenance costs of I-185 extrapolated for 43.5 miles and 30 years.
5 Economic Impact of I-73 in South Carolina, Chruma Economics, May 2011.
6 Chmura Economics & Analytics, *Economic Impact of I-73 in South Carolina*. Florence: Northeastern Strategic Alliance, May 2011.
7 Ratios >1 are a benefit to the community. Ratio's <1 are a community cost.
8 Multiplier of 2.1 * AADT
9 Speed effects transportation efficiency. Speeds lower than posted limits, decreases economic efficiency.
10 "The Grand Strand Expressway", Smart Mobility, March 2011.
11 "The Grand Strand Expressway", Smart Mobility, March 2011.
12 TREDIS is the Transportation Economic Development Impact System (TREDIS, 2010). It is an integrated framework for transportation planning and project assessment designed to cover a wide range of applications – from looking at the benefit/cost impact of a single transportation investment to analyzing the macroeconomic impacts of alternative long-range plans such as the I-73 and GSX systems.
13 "the ratio of indirect economic effect in the region where the direct impact does not originate divided by total indirect effect in SC DOT data based on Maintenance costs of I-185 extrapolated for 43.5 miles and 30 years.
14 Recent Power Point presentation "Getting to Good", by South Carolina Secretary of Transportation, Robert J. St. Onge, Jr.

Methodology

Transportation Economic Impacts:

TREDIS calculates the transportation economic impacts of I-73 and the alternative SC 38/US 501. TREDIS model inputs include the travel demand characteristics for each build and a no-build scenario. Those characteristics include period vehicle trips, period vehicle miles traveled, period vehicle hours traveled, fraction congested, buffer time, average crew members, and average vehicle occupancy. Travel savings are calculated for passenger (personal/recreational) vehicles as a result of other studies being focused on tourism impacts of the project. See Table 2.

Construction Impacts:

Construction impacts are calculated using the total construction costs for the years 2013 through 2015 for SC 38/US 501 and 2015 through 2020 for I 73. The source for construction cost and miles for I 73 in South Carolina, south segment, and the SC 38/US 501 alternatives are from Smart Mobility (Smart Mobility, 2011). Construction impact calculations are carried out by TREDIS, which uses standard IMPLAN® methodology for a period of 20 years with analysis for each alternative done in the year 2030.

Geography:

Study area includes the South Carolina counties of Dillon, Marion, and Horry. Linked counties are not included in any of the scenarios.

Time Period:

Transportation estimates are for the year 2030. Estimates are based on 2009 AADT traffic data and 2005 Travel Demand Model (TDM) traffic data. Economic estimates are in 2030 dollars.

Road Transportation Data and Estimation Method

Data

Proposed road project graphics are included in the Smart Mobility Report (Smart Mobility, 2011). A detailed analysis of the SC 38 and US 501 highways is accomplished using Google Earth®[1] and South Carolina Department of Transportation (SCDOT) 2009 traffic count data.

Transportation projects within a transportation network create complex outcomes that affect the network in some ways that can be measured and others that can't. This estimation process uses 2009 SCDOT traffic count data, and industry standard travel efficiency gains from improvements to create alternative scenarios that lead to economic gains. We estimate the location of the traffic counting stations based on information provided by SCDOT. Each station is assigned to a relevant highway segment and its characteristics, such as number of lanes, width and bottlenecks are recorded. Highway levels of service (LOS) characteristics are then estimated using the Transportation Research Board's Highway Capacity Manual (HCM)(Transportation Research Board, 2010).[2] Each segment is measured, and then summed to a total[3] highway length. Eleven sections are measured using this method.

Methodology
(continued)

Estimation

Each road segment is individually analyzed, using standard multilane highway segment methodology for the automobile mode.[4] There are six steps to calculating the level of service (LOS):

- Define basic traffic volume (AADT)
- Calculate free flow speed (FFS)
- Select FFS curve
- Calculate peak hour factor (PHF)
- Estimate speed and density
- Calculate LOS

The primary inputs for the analysis are average annual daily trips (AADT), miles, and speed (HCM). From those data, 2030 AADT volume is calculated. This is estimated with a multiplier of 2.1. We convert demand to peak volume, or Vp[5], which includes adjustments such as peak hour factor (PHF). A multiplier of 1.7 is used to estimate the peak volume, the variable fHV. Finally, free flow speed is estimated,[6] allowing for an estimate of automobiles per lane per mile. With this information we are able to estimate the LOS for peak demand in the year 2030.

In addition to these calculations we also encountered three bottlenecks, two of which included intersections. We chose not to analyze these intersections, but instead estimated the LOS to be "C" during non-peak with an LOS of "F" (most extreme) during peak times for the year 2030. To estimate intersection LOS, the HCM standard is available. Unfortunately, accurately estimating intersection LOS impact requires more than 100 inputs per intersection. Although the analysis is detailed, it is not accurate because it does not contain specific traffic intersection data. We therefore applied industry best estimates and assumed peak LOS "F" where appropriate.

Intersection "penalties" are applied to appropriate segments, then combined with the multilane highway segment data, and totaled for the highway being analyzed, creating three 2030 scenarios: no build, build SC 38/US 501, and build I-73. Final calculations are exported to TREDIS for analysis, sensitivity evaluation, and final estimate reports. Network efficiency economic impacts are calculated separately as are construction impacts. Both impacts represent total transportation-related economic impact from road improvements for the build scenarios.

Benefit/Cost Analysis

We used the Office of Management and Budget revised Circular A-94 (1992) to estimate the discount rate for the project. Over the last 33 years the rate has averaged slightly over 7 percent. The 2011 rate is 4.2 percent. We chose a rate of 5 percent for future estimates.[7]

Report Accuracy and Precision

Accuracy and precision are independent but complementary concepts. Accuracy relates to achieving a correct answer, while precision relates to the size of the estimation range of the parameter in question. This report does not contain field data collect by the authors but instead relies on estimates from other third parties with which we use to make capacity calculations. In most cases, field data, in general, on which the analyses are based, can only be expected to be accurate to within 5% or 10% of the true value. Thus, the computation performed with these inputs cannot be expected to be extremely accurate, and the final results must be considered as estimates that are accurate and precise only with the limits of the inputs used. Our estimates should be considered in the context of planning and preliminary engineering analysis and not used for operational or final highway design inputs.

TREDIS

TREDIS is the Transportation Economic Development Impact System (TREDIS, 2010). It is an integrated framework for transportation planning and project assessment, designed to cover a wide range of applications – from looking at the benefit/cost impact of a single transportation investment to analyzing the macroeconomic impacts of alternative long-range plans.

TREDIS operates as four separate but interconnected modules:

- Travel cost,
- Market access,
- Economic adjustment
- Benefit/cost, and
- Finance

Highway data is imported into TREDIS for analysis. Impacts are forecast using CRIO-IMPLAN multiregional forecasting model. The result is projected economic impacts for transportation infrastructure construction projects and changes in travel demand. A number of assumptions are required as part of the transportation analysis. Some estimates are derived from TDM and others from empirical research.

4. Chapter 14 (Transportation Research Board, 2010)
5. $V_p = \frac{V}{PHF \times N \times f_{HV} \times f_p}$
6. HCM Exhibit 14-5 LOS on Base Speed-Flow Curves
7. OMB Revised Circular A-94

Methodology

(continued)

Glossary

Average Annual Daily Traffic (AADT) — Used to calculate toll costs and buffer time costs.

Buffer Time — Variable used to capture the cost of travel time changeability. Unreliable travel times cause travelers to make early departures to "buffer" against potential delay.

Density — The number of vehicles occupying a given length of lane or roadway at a particular instant.

Free-Flow Speed (FFS) — 1) Theoretical speed in miles per hour when the density and flow rate on a study segment are both zero. 2) The prevailing speed in miles per hour on freeways at flow rates between 0 and 1,000 passenger cars per hour per lane (pc/h/ln).

Level of Service (LOS) — A numerical output from a traveler perception model that typically indicates the average rating travelers would give a transportation facility or service under a given set of conditions.

Net Present Value — Present value of future cash returns, discounted at the appropriate market interest rate, minus the present value of the cost of the investment (Ross, Westterfield, & Jaffe, 1996).

Peak Hour Factor (PHF) — The hourly volume during the analysis hour dived by the peak 15-min flow rate within the analysis hour; a measure of traffic demand fluctuation within the analysis hour.

Travel Demand Model (TDM) — Model that includes elements such as roadway and transit networks, population and employment data. The data are used to estimate the demand for transportation based on highway characteristic assumptions.

Vehicle Hours Traveled (VHT) — Variable is used to calculate passenger, crew, and freight time cost.

Vehicle Miles Traveled (VMT) — Variable is used to calculate accident costs, vehicle operating costs, and environmental costs. VMT should be annualized so that for a single study region, all periods sum to annual VMT.

Miley & Associates

Miley & Associates is one of the Southeast's leading economic and financial consulting firms. The firm specializes in economic impact analyses, fiscal impact analyses, feasibility reports, impact fee studies and benefit/cost modeling. Our clients include national and prominent local real estate developers, school districts, local governments, regional development agencies, and other private sector development firms. Miley & Associates partners appear regularly before decision-makers at all levels of government and understand the values, needs and desires of the clients they represent. With offices located in Columbia, South Carolina, the firm is well positioned to provide clients with hands-on service for projects throughout the entire Southeast region.

Miley & Associates appreciates that every research project is unique and deserves a custom solution. Public policy decisions are not made overnight, and we excel at providing advice and counsel along the way. We represent our clients. Our business plan is simple: we focus on exceeding our client's expectations and building long-term relationships.

Miley & Associates, Inc. was founded in 1993 by Harry W. Miley, Jr. Ph.D. The Company is an economic and financial consulting firm providing a range of analytical services to public and private sector clients. Miley & Associates conducts fiscal and economic impact analyses of proposed new developments and has extensive experience in assisting clients with their economic development and community revitalization projects.

Dr. Miley served as Chairman of the South Carolina Board of Economic Advisors (BEA) under two Governors. The BEA is responsible for estimating the State's revenues for the Governor and the General Assembly to use in formulating the State's annual budget. Dr. Miley was originally appointed as Chairman by Governor Carroll Campbell and continued to serve as Chairman for Governor David Beasley.

Dr. Miley was the Senior Executive Assistant for Economic Development to Governor Campbell from 1987 to 1989. Dr. Miley served as principal advisor to Governor Carroll Campbell on the state's policies for economic development, employment and training, work force and adult illiteracy, technical education and transportation issues.

Prior to joining the Governor's Office, Dr. Miley was on the faculty of the Moore School of Business at the University of South Carolina and Associate Director of the Division of Research at the School.

General Limiting Conditions

This economic impact analysis is not a budget or forecasting document and is not intended to depict a definitive course of action. Moreover, economic impact analysis is not designed as a space or facility-planning document. Many assumptions underlying economic impact analyses are based on policy decisions which, if modified, would affect the overall results.

This study is based on estimates, assumptions and other information developed by Miley & Associates, Inc. from its independent research effort, consultations with the client and its representatives, and primary and secondary sources. We have utilized sources that are deemed to be reliable but cannot guarantee their accuracy. Moreover, estimates and analysis are based on trends and assumptions and, therefore, there will usually be differences between projected and actual results because events and circumstances frequently do not occur as expected, and those differences may be material. No responsibility is assumed for inaccuracies in reporting by the client, the client's agent and representatives or any other data source used in preparing this study.

This report is based on information that was current as of April 2012 and Miley & Associates, Inc. has not undertaken any update of its research effort since that date. We have no obligation, unless subsequently engaged, to update this report or revise this analysis as presented due to events or conditions occurring after the date of this report.

Possession of this study does not carry with it the right of publication thereof or to use the name of "Miley & Associates, Inc." in any manner without first obtaining the prior written consent of Miley & Associates, Inc. No abstracting, excerpting or summarization of this study may be made without first obtaining the prior written consent of Miley & Associates, Inc. This report is not to be used in conjunction with any public or private offering of securities or other similar purpose. This study may not be used for purposes other than that for which it is prepared or for which prior written consent has first been obtained from Miley & Associates, Inc.

This study is qualified in its entirety by, and should be considered in light of, these limitations, conditions and considerations.

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SCDOT

January 4, 2011

Ms. Tina Hadden
US Army Corps of Engineers
Chief, Regulatory Branch
69A Hagood Street
Charleston, South Carolina 29403

Re: Proposed I-73 – Section 404 Individual Permit, Marlboro, Dillon, Marion and Horry Counties, South Carolina. SCDOT Pin 36358_RD01; Total Impact is 342.3 acres fill, clearing, and excavation of wetlands and 4,643 linear feet of piping, culverting and clearing of Jurisdictional Waters

Dear Ms. Hadden:

The South Carolina Department of Transportation (SCDOT) is requesting authorization for a **Clean Water Act, Section 404 Individual Permit** for unavoidable impacts to jurisdictional waters of the United States associated with the above referenced project.

Enclosed please find a permit request package that includes the completed joint application form; the Impact Assessment Form, I-73 Project Summary, the jurisdictional determination letters; permit drawings; compensatory mitigation worksheets, copies of approval letters from the USFWS and State Historic Preservation Officer; hydrological study notes, conceptual mitigation plan and public notice mailing list data form for the adjacent property owners.

SCDOT understands our responsibility for providing all required information to constitute a complete notification and any compensatory mitigation necessary to comply with the Charleston District Compensatory Mitigation SOP. Furthermore, SCDOT will ensure compliance with the **IP** terms and conditions.

If necessary, SCDOT will obtain and provide the Corps with a copy of all appropriate state certifications and/or authorizations (i.e. 401 Water Quality Certification, State Navigable Waters Permit) prior to commencement of work. In addition, SCDOT agrees to submit a signed compliance certification to the Corps within 30 days following completion of the authorized work to include evidence that any required mitigation has been executed. SCDOT hereby requests that this project be authorized.

A total of 4,173.83 wetland and 18,220.0 stream credits will be required. A Conceptual Compensatory Mitigation Plan for the project has been completed and is attached to this application.

Sincerely,

Randall D. Williamson

Randall D. Williamson, P.E.
Environmental Engineer

RDW:edb
enclosures
cc: Mr. Charles Hightower, SCDHEC Water Quality Certification (with attachments)
Ms. Tess Rogers, SCDHEC OCRM (with attachments)
Mr. Mark Caldwell, USFWS (with attachments)
Mr. Bob Perry, SCDNR (with attachments)
Mr. Bob Lord, EPA (with attachments)
ec: Mr. Sean Connolly, Permits Manager
File: Env/RDW

INDIVIDUAL PERMIT

Joint Federal and State Application Form For Activities Affecting Waters of the United States Or Critical Areas of the State of South Carolina	This Space for Official Use Only. Application # ________ Date Received: ________ Project Manager: ________

Authorities: 33 USC 401, 33 USC 403, 33 USC 407, 33 USC 408, 33 USC 1341, 33 USC 1344, 33 USC 1413 and Section 48-39-10 et. seq. of the South Carolina Code of Laws. These laws require permits for activities in, or affecting, navigable waters of the United States, the discharge of dredged or fill material into waters of the United States, and the transportation of dredged material for the purpose of dumping it into ocean waters. The Corps of Engineers and the State of South Carolina have established a joint application process for activities requiring both Federal and State review or approval. Under this joint process, you may use this form, together with the required drawings and supporting information, to apply for both the Federal and/or State permit(s).

Drawings and Supplemental Information Requirements: In addition to the information on this form, you must submit a set of drawings and, in some cases, additional information. A completed application form together with all required drawings and supplemental information is required before an application can be considered complete. See the attached instruction sheets for details regarding these requirements. You may attach additional sheets if necessary to provide complete information.

1. Applicant's Name. South Carolina Department of Transportation Attn: Mr. Randall D. Williamson, P.E.	4. Agent's Name (an agent is not required). The LPA Group Incorporated Attn: Renee Y Flinchum-Bowles or Gordon Murphy
2. Applicant's Address. Post Office Box 191 Columbia, SC 29202	5. Agent's Address. Post Office Box 5805 Columbia, SC 29250
3. Applicant's Contact Number (include area code). Residence: Business: (803) 737-1700 FAX: (803) 737-1394	6. Agent's Contact Number (include area code). Residence: Business: (803) 231-3922 or (803) 231-3876 FAX: (803) 231-4186
7. Project Title. I-73 (SCDOT PIN 36358_RD01)	9. Project Location. Marlboro, Dillon, Marion & Horry Counties, SC Street Address: See Location Maps (Sheets 1-10) County: Marlboro, Dillon, Marion & Horry Latitude: Start 34°47'33" N — End 33°56'17" N Longitude: 79°39'37.5" W — 79°04'06" W
8. Nearest Waterbody to project site (if known). Little Reedy Creek, Crooked Creek, Hagins Prong, Little Pee Dee River, Back Swamp, Black Creek, etc.	

10. Directions to the Site (attach additional sheets if needed).

SEE ATTACHED LOCATION MAPS – SHEETS 1, 2, 3, 4, 5, 6, 7, 8, 9 and 10 of 178

11. Description of the Overall Project and Each Activity in or Affecting U.S. Waters or State critical areas (attach additional sheets if needed).

SEE ATTACHED SCDOT IMPACT ASSESSMENT AND I-73 PROJECT SUMMARY

12. Overall Project Purpose and the Basic Purpose of each Activity in or Affecting U.S. Waters (attach additional sheets if necessary).

SEE ATTACHED SCDOT IMPACT ASSESSMENT AND I-73 PROJECT SUMMARY

INDIVIDUAL PERMIT

Joint Federal and State Application Form For Activities Affecting Waters of the United States Or Critical Areas of the State of South Carolina	This Space for Official Use Only. Application # ________ Date Received: ________ Project Manager: ________

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12. Overall Project Purpose and the Basic Purpose of each Activity in or Affecting U.S. Waters (attach additional sheets if necessary).

SEE ATTACHED SCDOT IMPACT ASSESSMENT AND I-73 PROJECT SUMMARY

INDIVIDUAL PERMIT

13. Type and Quantity of Materials To Be Discharged.

Dirt or Topsoil:	2,238,500	cy
Clean Sand:		cy
Mud:		cy
Clay:		cy
Gravel, Rock, or Stone:	447,700	cy
Concrete:	895,400	cy
Other (describe):		cy
TOTAL:	3,581,600	cy

14. Type and Quantity of Impacts to U.S. Waters (including wetlands).

Filling:	271.9	☒ acres ☐ sq. ft.	3,581,600	cy
Backfill & Bedding:		☐ acres ☐ sq. ft.		cy
(Temp) Landclearing:	(48.9) 17.1	☒ acres ☐ sq. ft.		cy
Dredging or Excavation:	4.4	☒ acres ☐ sq. ft.		cy
Flooding:		☐ acres ☐ sq. ft.		cy
Draining:		☐ acres ☐ sq. ft.		cy
Shading:		☐ acres ☐ sq. ft.		cy
TOTALS	342.3	☒ acres ☐ sq. ft.	3,581,600	cy

15. Names and Addresses of All Adjoining Property owners (attach additional sheets if needed).

SEE ATTACHED PUBLIC NOTICE MAILING LIST DATA FORM AND MAILING LABELS

16. Has any portion of the work already commenced? If yes, describe all work that has been done and the dates of the work.

NO

17. List all Certifications, Approvals, and Denials received from Federal, State, or Local Agencies for work described in this application.

USACE I-73 South Wetland Approximation March 18, 2008; SAC # 2007-1331-DJS (see attached letter).
USFWS I-73 South Biological Assessment Concurrence October 16, 2007, (see attached letter)
USACE I-73 North Wetland Approximation December 14, 2009; SAC 2008-01333-DJS (see attached letter).
USFWS I-73 North Biological Assessment Concurrence August 6, 2008, (see attached letter)
SHPO Concurrence, South September 24, 2007, September 4, 2007, and April 30, 2007; North MOA, July 17, 2008 and September 23, 2008

18. Authorization of Agent.
I hereby authorize the agent whose name is given in block number 4 of this application to act in my behalf in the processing of this application and to furnish supplemental information in support of this application.

Randall O. Williams 1/4/2011
Applicant's Signature Date

19. Certification.
Application is hereby made for a permit or permits to authorize the work and uses of the work as described in this application. I certify that the information in this application is complete and accurate. I further certify that I possess the authority to undertake the work described herein or am acting as the duly authorized agent for the applicant.

Randall O. Williams 1/4/2011 Renee G. Fleischman Bowle 8/26/2010
Applicant's Signature Date Agent's Signature Date

The application must be signed by the person who desires to undertake the purposed activity or it may be signed by a duly authorized agent if the authorization statement in blocks 4 and 18 have been completed and signed. 18 U.S.C. Section 1001 provides that: Whoever, in any manner within the jurisdiction of any department of the United States knowingly and willfully falsifies, conceals, or covers up any trick, scheme, or disguises a material fact or makes any false, fictitious or fraudulent statements or representations or makes or uses any false writing or document knowing same to contain any false, fictitious or fraudulent statements or entry, shall be fined not more than $10,000 or imprisoned not more than five years or both.

Submit the completed application form with the required drawings and all supporting information as indicated below.

Send all original application materials to:
U.S. Army Corps of Engineers
Charleston District, Regulatory Division
69A Hagood Avenue
Charleston, South Carolina 29403-5107
(843) 329-8044

Send one complete copy to:
S. C. Dept. of Health & Environmental Control
Office of Ocean and Coastal Resource Management
1362 McMillan Avenue, Suite 400
Charleston, South Carolina 29405
(843) 744-5838

Send one complete copy to:
S. C. Dept. of Health & Environmental Control
Office of Environmental Quality Control
2600 Bull Street
Columbia, South Carolina 29201
(803) 898-4300

INDIVIDUAL PERMIT

13. Type and Quantity of Materials To Be Discharged.			14. Type and Quantity of Impacts to U.S. Waters (including wetlands).				
Dirt or Topsoil:	2,238,500	cy	Filling:	271.9	☒ acres ☐ sq. ft.	3,581,600	cy
Clean Sand:		cy	Backfill & Bedding:		☐ acres ☐ sq. ft.		cy
Mud:		cy	(Temp) Landclearing:	(48.9) 17.1	☒ acres ☐ sq. ft.		cy
Clay:		cy	Dredging or Excavation:	4.4	☒ acres ☐ sq. ft.		cy
Gravel, Rock, or Stone:	447,700	cy	Flooding:		☐ acres ☐ sq. ft.		cy
Concrete:	895,400	cy	Draining:		☐ acres ☐ sq. ft.		cy
Other (describe):		cy	Shading:		☐ acres ☐ sq. ft.		cy
TOTAL:	3,581,600	cy	TOTALS	342.3	☒ acres ☐ sq. ft.	3,581,600	cy

15. Names and Addresses of All Adjoining Property owners (attach additional sheets if needed).

SEE ATTACHED PUBLIC NOTICE MAILING LIST DATA FORM AND MAILING LABELS

16. Has any portion of the work already commenced? If yes, describe all work that has been done and the dates of the work.

NO

17. List all Certifications, Approvals, and Denials received from Federal, State, or Local Agencies for work described in this application.

USACE I-73 South Wetland Approximation March 18, 2008; SAC # 2007-1331-DJS (see attached letter).
USFWS I-73 South Biological Assessment Concurrence October 16, 2007, (see attached letter)
USACE I-73 North Wetland Approximation December 14, 2009; SAC 2008-01333-DJS (see attached letter).
USFWS I-73 North Biological Assessment Concurrence August 6, 2008, (see attached letter)
SHPO Concurrence, South September 24, 2007, September 4, 2007, and April 30, 2007; North MOA, July 17, 2008 and September 23, 2008

18. Authorization of Agent.
I hereby authorize the agent whose name is given in block number 4 of this application to act in my behalf in the processing of this application and to furnish supplemental information in support of this application.

Applicant's Signature Date

19. Certification.
Application is hereby made for a permit or permits to authorize the work and uses of the work as described in this application. I certify that the information in this application is complete and accurate. I further certify that I possess the authority to undertake the work described herein or am acting as the duly authorized agent for the applicant.

Applicant's Signature Date

Renée G. Flinchum-Boerke 8/26/2010
Agent's Signature Date

The application must be signed by the person who desires to undertake the purposed activity or it may be signed by a duly authorized agent if the authorization statement in blocks 4 and 18 have been completed and signed. 18 U.S.C. Section 1001 provides that: Whoever, in any manner within the jurisdiction of any department of the United States knowingly and willfully falsifies, conceals, or covers up any trick, scheme, or disguises a material fact or makes any false, fictitious or fraudulent statements or representations or makes or uses any false writing or document knowing same to contain any false, fictitious or fraudulent statements or entry, shall be fined not more than $10,000 or imprisoned not more than five years or both.

Submit the completed application form with the required drawings and all supporting information as indicated below.

Send all original application materials to:
U.S. Army Corps of Engineers
Charleston District, Regulatory Division
69A Hagood Avenue
Charleston, South Carolina 29403-5107
(843) 329-8044

Send one complete copy to:
S. C. Dept. of Health & Environmental Control
Office of Ocean and Coastal Resource Management
1362 McMillan Avenue, Suite 400
Charleston, South Carolina 29405
(843) 744-5838

Send one complete copy to:
S. C. Dept. of Health & Environmental Control
Office of Environmental Quality Control
2600 Bull Street
Columbia, South Carolina 29201
(803) 898-4300

Attachment "B"

SCDOT IMPACT ASSESSMENT

I. Processing

1. Check all of the approval(s) requested for this project:

☒ Section 404 Permit	☐ ACOE General Permit
☒ Section 10 Permit	☐ Nav. Water General Permit
☒ 401 Water Quality Certification	☒ CZMC – (OCRM)

II. Applicant Information

1. Agent/Consultant Information

Name: Ms. Renee Flinchum-Bowles or Mr. Gordon Murphy

Company Affiliation: The LPA Group Incorporated

Mailing Address: P.O. Box 5805

Columbia, SC 29250

Telephone Number: (803) 231-3922 or (803) 231-3876 Fax Number: (803) 231-4186

E-mail Address: ryflinchum@lpagroup.com or gmurphy@lpagroup.com

III. Project Information

Attach a **vicinity map** clearly showing the location of the property with respect to local landmarks such as towns, rivers, and roads. The vicinity map must include a scale and north arrow. The maps and plans should include the appropriate USGS Topographic Quad Map with the project corridor outlined. For administrative and distribution purposes, the **USACE requires information to be submitted on sheets no larger than 8.5 by 11-inch format**.

1. Name of project: I-73 (SCDOT PIN 36358_RD01)
2. Location
   County: Marlboro, Dillon, Marion, & Horry Nearest Town: Bennettsville, Dillon, Latta, Mullins, Conway
   Directions to site (include road numbers, landmarks, etc.): See attached location map
3. Site coordinates, if available (UTM or Lat/Long):
   1. START 34° 47' 33" N, 79° 39' 37.5" W (NAD83/WGS84)
   2. STOP 33° 56' 17" N, 79° 04' 06" W (NAD83/WGS84)
4. Property size (acres): Approximately 7,375 acres
5. Nearest body of water (stream/river/sound/ocean/lake): Crooked Creek, Beverly Creek, Hagins Prong, Cottingham Creek, Little Reedy Creek, Little Pee Dee River, Black Creek, Back Swamp, Lake Swamp, etc. and many unnamed tributaries
6. Describe the existing conditions on the site and general land use in the vicinity: The project site includes many existing roadways of Marlboro, Dillon, Marion and Horry Counties, South Carolina, including I-95 and SC 22 (Conway Bypass). Properties in the general vicinity include commercial, industrial, residential, agricultural, and undeveloped properties. Numerous tributaries of the Little Pee Dee River cross the project area, as does the river itself. SC DNR and DHEC classify the portion of the Little Pee Dee River that is in the project area as State Navigable Water.

7. Describe the overall project in detail: The project is to construct I-73, an interstate highway, on new alignment beginning at the NC/SC state line northeast of Bennettsville in Marlboro County and terminating at SC Route 22, northwest of Conway, SC. The project includes construction of new twin bridges over the Little Pee Dee River and Black Creek, interchanges, over/under passes, and improvements to intersections. The project would follow standard interstate design with frontage roads and entrance/exit ramps at interchanges, storm water facilities, grassed medians and shoulders, and barrier fences.

8. Explain the purpose of the proposed work: The I-73 Corridor was identified as a High Priority Corridor by the U.S. Congress in the Intermodal Surface Transportation Efficiency Act (ISTEA) of 1991. Congress designated high priority corridors as those that would provide the most efficient way of integrating regions, linking major population centers of the country, providing opportunities for increased economic growth, and serving the travel and commerce needs of the nation. The corridors that Congress designated were to be included in the National Highway System. The proposed project is the South Carolina segment of the I-73/I-74 High Priority Corridor and is currently listed as number five on the National Highway Systems High Priority Corridors list. A feasibility study was completed in June of 2003 and cited the needs of fulfilling congressional intent and providing an interstate link to the Grand Strand area along with the benefits of improved hurricane evacuation, improved capacity for vehicular and freight movement in the area, and support of population and economic growth as reasons for building I-73. The purpose of the Southern Portion is to provide an interstate link between I-95 and the Myrtle Beach region to serve residents, businesses, and tourists while fulfilling congressional intent in an environmentally responsible and community-sensitive manner. The I-73 Northern Portion would provide a direct connection from I-74 in North Carolina to I-95 in South Carolina. The I-73 Southern Portion would provide a direct interstate-standard travel corridor from I-95 northwest of Dillon, SC, to SC 22 northwest of Conway, SC. A detailed analysis of the purpose and need of the project is included in the Final Environmental Impact Statement (FEIS) for both portions of the project. Copies of the Northern and Southern FEISs are available upon request. A written Re-evaluation of the Southern FEIS for I-73 South was completed that addressed the design changes and value engineering modifications. A copy is available upon request.

9. List all Certifications, Approvals, and/or Denials received for this project:

   USACE I-73 South Wetland Approximation March 18, 2008; SAC # 2007-1331-DJS.
   USFWS I-73 South Biological Assessment Concurrence October 16, 2007,
   USACE I-73 North Wetland Approximation December 14, 2009; SAC 2008-01333-DJS.
   USFWS I-73 North Biological Assessment Concurrence August 6, 2008,
   SHPO Concurrence, South September 24, 2007, September 4, 2007, and April 30, 2007; North MOA, July 17, 2008 and September 23, 2008

10. Has any portion of the work already commenced? If yes, describe: No

IV. Proposed Impacts to Waters of the United States/Waters of the State

All proposed impacts, permanent and temporary, must be listed herein, and must be clearly identifiable on an accompanying site plan. All wetlands and waters, and all streams (intermittent and perennial) must be shown on a delineation map, whether or not impacts are proposed to these systems. Wetland and stream evaluation and delineation forms should be included as appropriate. Photographs shall be included.

1. Individually list **wetland impacts** below:

Wetland Impact Site Number (indicate on map)	Type of Impact*	Area of Impact (acres)				Located within 100-year Floodplain (yes/no)	Distance to Nearest Stream (linear feet)	Type of Wetland**
		Fill	Temp. Clear	Perm. Clear	Excav.			
D 2	FILL/ EXCAV	0.2	0	0	0.08	NO	985	CLEARCUT PINE WET FLATWOOD
D 3	FILL	0.01	0	0	0	NO	2	JURISDICTIONAL DITCH
D 5	FILL/CLEAR	1.44	0.64	0.07	0.5	YES	2	BOTTOMLAND HARDWOOD
D 6	FILL/CLEAR	0.1	0.01	0	0	NO	721	PINE WET FLATWOOD
D 7	FILL/CLEAR	0.02	0.006	0	0	NO	1	EXCAVATED WETLAND
D 10	FILL/CLEAR	0.79	0.08	0	0	YES	4	BOTTOMLAND HARDWOOD
D 12	FILL/CL/EX	5.65	0.42	0	0.42	NO	117	CLEARCUT PINE WET FLATWOOD
D 13	FILL/CLEAR	0.03	0.02	0	0	NO	616	ISOLATED BOTTOMLAND HARDWOOD
D 14	FILL/CLEAR	0.09	0.01	0	0.01	NO	689	ISOLATED BOTTOMLAND HARDWOOD
D 15	N/A	0	0	0	0	NO	785	FRESHWATER MARSH
D 16	FILL/CLEAR	0.07	0	0	0	NO	771	CLEARCUT PINE WET FLATWOOD
D 19	FILL	0.17	0	0	0	NO	419	BOTTOMLAND HARDWOOD
D 20	N/A	0	0	0	0	NO	308	WET MANAGED PINE STAND
D 22	FILL	0.29	0	0	0	NO	0	JURISDICTIONAL DITCH
D 23	FILL/CLEAR	0.02	0.01	0	0	NO	15	CLEARCUT PINE WET FLATWOOD
D 25	FILL	0.02	0	0	0	NO	0	BOTTOMLAND HARDWOOD
D 27	FILL	0.14	0	0	0	NO	0	JURISDICTIONAL DITCH
D 30	FILL/CL/EX	0.14	0.23	0	0.02	NO	5	BOTTOMLAND HARDWOOD
D 33	FILL	0.19	0	0	0	NO	4	JD DITCH/ BOTTOMLAND HARDWOOD
D 34	FILL	0.002	0	0	0	NO	2	WET MANAGED PINE STAND
D 35	FILL/CLEAR	0.24	0.01	0	0	NO	4	BOTTOMLAND HARDWOOD
D 36	FILL	0.02	0	0	0	NO	3	JURISDICTIONAL DITCH
D 37	FILL	0.35	0	0	0	NO	3	DITCHED BOTTOMLAND HARDWOOD
D 38	FILL	0.18	0	0	0	NO	4	JURISDICTIONAL DITCH
D 39	FILL/CLEAR	0.06	0.01	0	0.01	NO	13	BOTTOMLAND HARDWOOD
D 40	FILL/CLEAR	3.01	0.60	0	0.41	NO	0	BOTTOMLAND HARDWOOD
D 44	FILL/CLEAR	1.23	0.1	0	0	NO	5	DECIDUOUS SHRUB SWAMP
D 45	FILL/CLEAR	1.68	0.15	0	0	YES	1	BOTTOMLAND HARDWOOD
D 46	FILL	0.01	0	0	0	NO	6	JURISDICTIONAL DITCH
D 47	FILL/CLEAR	0.73	0.48	0	0	NO	1	BOTTOMLAND HARDWOOD

Wetland Impact Site Number (indicate on map)		Type of Impact*	Area of Impact (acres)				Located within 100-year Floodplain (yes/no)	Distance to Nearest Stream (linear feet)	Type of Wetland**
			Fill	Temp. Clear	Perm. Clear	Excav.			
D	53	FILL/CL/EX	0.08	0.03	0	0.03	NO	12	BOTTOMLAND HARDWOOD/ DITCH
D	54	FILL	0.09	0	0	0	NO	0	JURISDICTIONAL DITCH
D	56	FILL/CLEAR	0.12	0	0	0	NO	12	BOTTOMLAND HARDWOOD
D	59	FILL/CLEAR	0.65	0.14	0	0	NO	67	BOTTOMLAND HARDWOOD
D	60	FILL	0.25	0	0	0	NO	0	JURISDICTIONAL DITCH
D	61	FILL/CLEAR	6.19	0.71	1.5	0	YES	0	WOODED SWAMP
D	64	FILL/CLEAR	3.68	0.39	0.55	0	YES	0	BOTTOMLAND HARDWOOD
D	67	FILL/CLEAR	0.48	0.14	0	0	NO	0	BOTTOMLAND HARDWOOD
H	1	FILL/CLEAR	3.64	0.26	0.56	0	YES	2	WOODED SWAMP/ FRESHWATER MARSH
H	2	FILL	0.07	0	0	0	YES	915	FRESHWATER MARSH
H	3	FILL/CLEAR	2.53	0.13	0	0	YES	770	PINE WET FLATWOOD
H	9	FILL/CLEAR	0.10	0.02	0	0	YES	1349	BOTTOMLAND HARDWOOD
H	10	FILL	0.62	0	0	0	YES	1256	FRESHWATER MARSHES
H	11	FILL	0.13	0	0	0	YES	529	FRESHWATER MARSH
H	12	FILL/CLEAR	3.54	0.31	1.03	0	YES	9	WOODED SWAMP/ FRESHWATER MARSH
H	14	FILL/CLEAR	4.81	0.29	0	0	YES	5	WOODED SWAMP/ FRESHWATER MARSH
H	15	FILL/CLEAR	7.45	0.52	0	0	YES	287	BOTTOMLAND HARDWOOD
H	16	FILL/CLEAR	0.1	0	0	0	NO	1400	DECIDUOUS SHRUB SWAMP
H	18	FILL/CL/EX	10.79	0.36	0	0	NO	1464	DITCHED BAY FOREST
H	20	FILL/CL/EX	1.59	0.36	0	0	NO	1045	PINE WET FLATWOOD
H	21	FILL	0.21	0	0	0	NO	1670	FRESHWATER MARSH
H	23	FILL	0.052	0	0	0	NO	1692	JURISDICTIONAL DITCH
H	25	FILL/CL/EX	2.82	0.1	0	0.55	NO	2815	DITCHED PINE WET FLATWOOD
H	26	FILL	0.49	0	0	0	NO	3109	PINE WET FLATWOOD/ DEC. SHRUB
H	27	FILL/CLEAR	4.23	0.35	0	0	NO	2728	PINE WET FLATWOOD/ DEC. SHRUB
H	28	FILL/CLEAR	0.21	0.02	0	0	NO	2255	BOTTOMLAND HARDWOOD/ JUR. DITCH
H	30	FILL/CL/EX	2.28	0.23	0	0	NO	2566	PINE WET FLATWOOD/ JURISDICTIONAL DITCH
H	33	FILL/CLEAR	2.54	0.47	0	0	NO	538	DITCHED PINE WET FLATWOOD
H	36	FILL/CLEAR	0.13	0.04	0	0	NO	0	DITCHED PINE WET FLATWOOD/ JURISDICTIONAL DITCH
H	37	FILL/CLEAR	0.48	1.06	0	0	NO	928	DITCHED BOTTOMLAND HARDWOOD
H	38	FILL/CLEAR	15.88	1.71	0.95	0	YES	833	WOODED SWAMP

Wetland Impact Site Number (indicate on map)	Type of Impact*	Area of Impact (acres)				Located within 100-year Floodplain (yes/no)	Distance to Nearest Stream (linear feet)	Type of Wetland**
		Fill	Temp. Clear	Perm. Clear	Excav.			
H 41	FILL/CL/EX	0.9	0.71	0	0.46	NO	549	DITCHED PINE WET FLATWOOD
H 42	FILL/CL/EX	4.74	1.40	0	0.35	NO	455	DITCHED PINE WET FLATWOOD
H 44	FILL/CLEAR	0.57	0.03	0	0	NO	266	ISOLATED BOT. HARDWOOD
H 45	FILL/CLEAR	0.13	0.01	0	0	NO	171	ISOLATED BOT. HARDWOOD
H 46	FILL/CL/EX	1.03	0.11	0	0	NO	76	DITCHED BOTTOMLAND HARDWOOD
H 49	FILL/CLEAR	0.69	0.06	0	0	NO	1007	PINE WET FLATWOOD
H 51	FILL/CLEAR	2.77	1.03	0	0	NO	183	DITCHED PINE WET FLATWOOD
H 52	FILL/CLEAR	5.73	0.91	0	0	NO	0	DITCHED BOTTOMLAND HARDWOOD
H 54	FILL/CLEAR	0.06	0.02	0	0	NO	935	CLEARCUT PINE WET FLATWOOD
H 55	FILL/CL/EX	5.59	1.25	0	0	NO	4	CLEARCUT PINE WET FLATWOOD
H 56	FILL/CLEAR	0.04	0.77	0	0	NO	0	BOTTOMLAND HARDWOOD
H 57	FILL/CLEAR	0.86	0.03	0	0	NO	0	PINE WET FLATWOOD
H 58	FILL/CLEAR	5.48	0.44	0.52	0	YES	1484	BOTTOMLAND HARDWOOD
H 61	FILL/CLEAR	0.71	0.07	0.09	0	YES	1925	DITCHED BOTTOMLAND HARDWOOD
H 62	FILL	0.01	0	0	0	NO	1723	BOTTOMLAND HARDWOOD
H 63	FILL/CLEAR	1.44	0.31	0	0	NO	1027	PINE WET FLATWOOD
H 65	N/A	0	0	0	0	NO	958	PINE WET FLATWOOD
H 67	FILL	0.09	0	0	0	NO	608	JURISDICTIONAL DITCH
H 68	FILL/CLEAR	0.40	0.01	0	0	NO	474	PINE WET FLATWOOD
H 69	FILL/CLEAR	0.04	0.04	0	0	NO	578	PINE WET FLATWOOD
H 71	FILL/CLEAR	0.87	0.13	0	0	NO	1	PINE WET FLATWOOD
H 72	FILL/CLEAR	1.28	0.21	0	0	NO	22	DITCHED PINE WET FLATWOOD
H 76	FILL/CLEAR	3.12	0.23	0	0	NO	96	DITCHED PINE WET FLATWOOD
H 77	FILL/CLEAR	0.02	0.03	0	0	NO	34	PINE WET FLATWOOD
H 78	FILL/CLEAR	0.11	0.04	0	0	NO	986	ISOLATED PINE WET FLATWOOD
H 79	FILL/CLEAR	13.9	2.06	0	0	NO	1	PINE WET FLATWOOD
H 84	FILL/CLEAR	0.12	0.03	0	0	NO	1749	ISOLATED PINE WET FLATWOOD
H 90	FILL/CL	0.86	0.62	0	0	NO	31	DITCHED BOTTOMLAND HARDWOOD
H 94	FILL/ EXCAV	0.56	0	0	0	NO	2134	ISOLATED FRESHWATER MARSH
H 98	FILL/CL/EX	1.54	0.26	0	0.54	NO	5208	PINE WET FLATWOOD
H 101	FILL/CLEAR	0.49	0.12	0	0	NO	4938	PINE WET FLATWOOD
H 103	FILL/CLEAR	0.73	0.08	0	0	NO	4624	PINE WET FLATWOOD

Wetland Impact Site Number (indicate on map)	Type of Impact*	Area of Impact (acres)				Located within 100-year Floodplain (yes/no)	Distance to Nearest Stream (linear feet)	Type of Wetland**
		Fill	Temp. Clear	Perm. Clear	Excav.			
H 104	FILL/CLEAR	0.71	0.48	0	0	NO	4411	PINE WET FLATWOOD
H 109	FILL/CLEAR	3.25	0.41	0	0	NO	2078	DITCHED PINE WET FLATWOOD
H 110	FILL	0.14	0	0	0	NO	705	JURISDICTIONAL DITCH
H 111	FILL/CL/EX	5.63	1.15	0	0.37	NO	695	CLEARCUT PINE WET FLATWOOD
H 112	FILL/CLEAR	0.6	0.04	0	0	NO	83	PINE WET FLATWOOD
H 113	FILL/CLEAR	0.45	0.03	0	0	NO	1115	PINE WET FLATWOOD
H 115	CLEAR	0	0.28	0	0	NO	102	PINE WET FLATWOOD
H 116	CLEAR	0	0.44	0	0	NO	586	PINE WET FLATWOOD
H 117	CLEAR	0	1.36	0	0	NO	1390	PINE WET FLATWOOD
H 118	FILL	0.14	0	0	0	NO	1218	JURISDICTIONAL DITCH
H 119	FILL/CLEAR	0	1.95	0	0	NO	211	DECIDUOUS SHRUB SWAMP
H 120	FILL/CLEAR	6.85	11.24	0	0	NO	324	DITCHED PINE WET FLATWOOD
H 123	FILL/CLEAR	0.19	0.54	0	0	NO	129	PINE WET FLATWOOD
M 1	FILL/CL/EX	1.84	0.65	0	0.1	NO	0	BOTTOMLAND HARDWOOD
M 3	FILL	0.02	0	0	0	NO	0	JURISDICTIONAL DITCH
M 5	FILL/CLEAR	0.03	0.03	0	0	NO	936	BOTTOMLAND HARDWOOD
M 11	FILL/CLEAR	1.23	0.58	0	0	NO	1	PINE WET FLATWOOD/ DEC. SHRUB
M 15	FILL/CLEAR	0.02	0.02	0	0	NO	43	DECIDUOUS SHRUB SWAMP
M 16	FILL/CLEAR	0.3	0.04	0	0	NO	4	BOTTOMLAND HARDWOOD/ DITCH
M 19	FILL/CLEAR	4.92	0	0	0.25	NO	873	CLEARCUT PINE WET FLATWOOD
M 23	FILL/CLEAR	0.55	0.52	0	0.03	NO	4	BOTTOMLAND HARDWOOD/ D SHRUB
M 24	FILL/CLEAR	0.16	0.02	0	0.02	NO	2	BOTTOMLAND HARDWOOD/ D SHRUB
M 25	FILL/CLEAR	0.02	0.01	0	0.01	NO	2	BOTTOMLAND HARDWOOD
M 30	FILL/CLEAR	2.29	0.25	0.58	0	NO	0	CYPRESS-GUM POND SWAMP
M 32	FILL	0.1	0	0	0	NO	1	JURISDICTIONAL DITCH
M 34	CLEAR	0	0.11	0	0	NO	0	CYPRESS-GUM POND SWAMP
M 35	CLEAR	0	0.03	0	0	NO	0	BOTTOMLAND HARDWOOD
M 36	FILL	0.18	0	0	0	NO	100	NON-JURISDICTIONAL DITCH
M 37	FILL	0.06	0	0	0	NO	115	FRESHWATER MARSH
M 40	FILL	0.77	0	0	0	NO	294	BOTTOMLAND HARDWOOD
M 42	FILL	0.02	0	0	0	NO	26	JURISDICTIONAL DITCH
M 43	CLEAR	0	0.32	0	0	NO	683	BOTTOMLAND HARDWOOD

Wetland Impact Site Number (indicate on map)	Type of Impact*	Area of Impact (acres)				Located within 100-year Floodplain (yes/no)	Distance to Nearest Stream (linear feet)	Type of Wetland**
		Fill	Temp. Clear	Perm. Clear	Excav.			
M 45	FILL/CLEAR	0.08	0.11	0	0	NO	1	BOTTOMLAND HARDWOOD
M 48	FILL/CLEAR	0.06	0.30	0	0	NO	2	BOTTOMLAND HARDWOOD
M 53	FILL/CLEAR	0.14	0.05	0	0	NO	3	BOTTOMLAND HARDWOOD
M 54	FILL/CLEAR	1.57	0.69	0	0	NO	1	BOTTOMLAND HARDWOOD
M 56	FILL/CLEAR	1.84	0.51	0.83	0	YES	613	BOTTOMLAND HARDWOOD
M 60	FILL	0.02	0	0	0	NO	697	JURISDICTIONAL DITCH
M 61	FILL	0.35	0	0	0	NO	700	BOTTOMLAND HARDWOOD
M 63	FILL/CLEAR	27.46	1.34	0	0	NO	1091	CLEARCUT BAY FOREST
M 66	N/A	0	0	0	0	NO	1878	CLEARCUT BAY FOREST
M 68	FILL/CLEAR	0.13	0.01	0	0	NO	1578	WET PLANTED PINE STAND
M 71	FILL	0.02	0	0	0	NO	12	JURISDICTIONAL DITCH
M 74	FILL/CLEAR	1.77	0.12	0	0	NO	310	BOTTOMLAND HARDWOOD
M 76	FILL/CLEAR	0.47	0.02	0	0	NO	1	BOTTOMLAND HARDWOOD
M 78	FILL/CLEAR	1.59	0.15	0	0	NO	5	BOTTOMLAND HARDWOOD
M 79	FILL/CLEAR	10.38	0.62	0.92	0	YES	148	BOTTOMLAND HARDWOOD
M 81	FILL/CLEAR	0.52	0.05	0	0	YES	978	DECIDUOUS SHRUB SWAMP
M 82	FILL/CLEAR	1.78	0.17	0	0	YES	1079	CLEARCUT BAY FOREST
M 84	FILL/CLEAR	9.61	0.83	2.10	0	YES	886	WOODED SWAMP
M 85	FILL/CLEAR	0.7	0	0	0	YES	65	WOODED SWAMP
M 86	FILL/CLEAR	8.55	0.43	0.64	0	YES	405	WOODED SWAMP
ML 1	FILL/CLEAR	2.36	0.16	0	0	NO	0	STREAMHEAD POCOSIN
ML 6	FILL/CLEAR	0.0001	0.001	0	0	NO	776	BOTTOMLAND HARDWOOD
ML 8	FILL	0.04	0	0	0	NO	0	JURISDICTIONAL DITCH
ML 10	FILL/CLEAR	0.03	0.03	0	0	NO	0	BOTTOMLAND HARDWOOD
ML 12	FILL/CLEAR	5.63	0.26	0.19	0	YES	0	BOT HARDWOOD/ FRESHWATER MARSH
ML 20	FILL	0.05	0	0	0	NO	0	JURISDICTIONAL DITCH
ML 22	FILL	0.03	0	0	0	NO	0	JURISDICTIONAL DITCH
ML 23	FILL/CLEAR	2.73	0.28	3.64	0	YES	0	FRESHWATER MARSH/ BOT HARDWOOD
ML 26	FILL/CLEAR	3.32	0.33	0	0	NO	0	BOTTOMLAND HARDWOOD
ML 31	FILL/CLEAR	0.004	0.01	0	0	NO	0	BOTTOMLAND HARDWOOD
ML 33	FILL/CLEAR	0	0	0	0	NO	895	BOTTOMLAND HARDWOOD

Wetland Impact Site Number (indicate on map)	Type of Impact*	Area of Impact (acres)				Located within 100-year Floodplain (yes/no)	Distance to Nearest Stream (linear feet)	Type of Wetland**
		Fill	Temp. Clear	Perm. Clear	Excav.			
ML 34	FILL/CLEAR	4.27	0.46	2.58	0	YES	0	BOTTOMLAND HARDWOOD
ML 35	FILL	0.07	0	0	0	NO	0	JURISDICTIONAL DITCH
ML 36	FILL/CLEAR	0.02	0.01	0	0	NO	624	NON-JURISDICTIONAL DITCH
ML 37	FILL/CLEAR	0.13	0.02	0	0	NO	661	BOTTOMLAND HARDWOOD
ML 38	FILL	0.03	0	0	0	NO	0	JURISDICTIONAL DITCH
ML 39	FILL/CL/EX	0.49	0.04	0	0.14	NO	0	WOODED SWAMP
ML 45	FILL	0.28	0	0	0	NO	0	JURISDICTIONAL DITCH
ML 46	FILL/CLEAR	0.01	0.02	0	0	NO	3	BOTTOMLAND HARDWOOD
ML 48	FILL/CL/EX	1.69	0.19	0	0.1	NO	4	BOTTOMLAND HARDWOOD
ML 53	FILL/CLEAR	0.0005	0.01	0	0	NO	0	BOTTOMLAND HARDWOOD
	Grand totals	267.2	48.9	17.1	4.4	337.6		

* List each impact separately and identify temporary impacts. Impacts include, but are not limited to: mechanized clearing, grading, fill, excavation, flooding, ditching/drainage, etc. For dams, separately list impacts due to both structure and flooding.

** List a wetland type that best describes wetland to be impacted (e.g., freshwater/saltwater marsh, forested wetland, beaver pond, Carolina Bay, bog, etc.) Indicate if wetland is isolated (determination of isolation to be made by USACE only).

List the total acreage (estimated) of all existing wetlands on the property: 410.55 acres

Total area of wetland impact proposed: 267.2 acres fill + 48.9 acres temporary clear + 17.1 acres permanent clear + 4.4 acres excavation = 337.6 acres total

The total wetland acreage on the property was estimated based on a variable-width corridor, including 300 feet along the mainline, 400 feet where frontage/access roads are located, and larger areas at interchanges. Area of impact acreages in the table include direct fill impacts from road construction, temporary clearing impacts associated with access by construction equipment along the toe-of-slope and around bridges, permanent clearing impacts underneath bridges, and excavation.

2.0 Individually list all **intermittent and perennial stream impacts** below:

Stream Impact Site Number (indicate on map)	Type of Impact*	Length of Impact (linear feet)	Stream Name**	Average Width of Stream Before Impact	Perennial or Intermittent? (please specify)
D 48	CULVERT	150	UT	10	PERENNIAL
D 49	PIPE	216	UT	10	PERENNIAL
D 63	BRIDGE	0	UT	10	PERENNIAL
D 63	CULVERT	72	UT	8	PERENNIAL
H 35	CULVERT	39	UT	8	INTERMITTENT
H 43	CULVERT	904	LONG BRANCH	16	PERENNIAL

Stream Impact Site Number	Type of Impact*	Length of Impact	Stream Name**	Average Width	Perennial or Intermittent? (please specify)
H 50	CULVERT	269	UT	6	INTERMITTENT
H 59	CULVERT	340	UT	6	INTERMITTENT
H 64	BRIDGE	0	JOYNER SWAMP	15	PERENNIAL
H 70	BRIDGE	0	UT	24	PERENNIAL
H 71	N/A	0	LOOSING SWAMP	6	PERENNIAL
H 81	CULVERT	239	UT	3	PERENNIAL
H 88	PIPE	299	UT	4	INTERMITTENT
H 105	CULVERT	307	UT	3	PERENNIAL
L. PEE DEE R.	BRIDGE	0	L. PEE DEE R.	360	PERENNIAL
M 2	PIPE	217	UT	6	PERENNIAL
M 3	FILL	120	UT	6	PERENNIAL
M 10	CULVERT	71	UT	4	INTERMITTENT
M 17	PIPE	396	UT	4	INTERMITTENT
M 46	CULVERT	38	UT	8	INTERMITTENT
M 47	PIPE	44	UT	6	INTERMITTENT
M 52	PIPE	922	UT	8	PERENNIAL
M 58	N/A	0	UT	6	INTERMITTENT

* List each impact separately and identify temporary impacts. Impacts include, but are not limited to: culverts and associated rip-rap, dams (separately list impacts due to both structure and flooding), relocation (include linear feet before and after, and net loss/gain), stabilization activities (cement wall, rip-rap, crib wall, gabions, etc.), excavation, ditching/straightening, etc.

** Stream names can be found on USGS topographic maps. If a stream has no name, list as UT (unnamed tributary) to the nearest downstream named stream into which it flows.

Cumulative impacts (linear distance in feet) to all streams on site: 4,643 linear feet

3.0 Individually list all **open water impacts** (including lakes, ponds, estuaries, sounds, Atlantic Ocean and any other water of the U.S.) below:

Open Water Impact Site Number (indicate on map)		Type of Impact*	Area of Impact (acres)	Name of Waterbody (if applicable)	Type of Waterbody (lake, pond, estuary, sound, bay, ocean, etc.)
D	1	N/A	0		NJ POND†
D	11	FILL	0.09		NJ POND
D	18	FILL	0.19		NJ POND
D	21	FILL	0.41		NJ POND & DITCH
D	31	FILL	0.27		NJ POND
D	**43**	**FILL**	**0.33**		**JD POND**
H	13	FILL	0.34		NJ POND
H	29	FILL	0.20		NJ POND

Open Water Impact		Type of Impact*	Area of Impact	Name of Waterbody	Type of Waterbody (lake, pond, estuary, sound,
H	34	FILL	0.28		NJ POND
H	39	FILL	0.35		NJ POND
H	**60**	**N/A**	**0**		**JD POND**
H	86	FILL	0.50		NJ POND
H	89	FILL	0.03		NJ POND
H	91	FILL	0.15		NJ POND & DITCHES
M	6	FILL	0.2		NJ POND
M	13	FILL	0.06		NJ POND
M	28	FILL	0.05		NJ POND
M	29	FILL	0.06		NJ POND
M	36	FILL	0.18		NJ POND
ML	**2**	**N/A**	**0**		**JD POND**
ML	**9**	**N/A**	**0**		**JD POND**
ML	**13**	**FILL**	**0.001**		**JD POND**
ML	30	FILL	0.93		NJ POND
		Grand total	4.621		
		JD total	0.331		

† NJ = Non-jurisdictional, JD = Jurisdictional

* List each impact separately and identify temporary impacts. Impacts include, but are not limited to: fill, excavation, dredging, flooding, drainage, bulkheads, etc.

V. Impact Justification (Avoidance and Minimization)

Specifically describe measures taken to avoid the proposed impacts. It may be useful to provide information related to site constraints such as topography, building ordinances, accessibility, and financial viability of the project. The applicant may attach drawings of alternative, lower-impact site layouts, and explain why these design options were not feasible. Also discuss how impacts were minimized once the desired site plan was developed. If applicable, discuss construction techniques to be followed during construction to reduce impacts. Please attach a separate sheet, as an appendix, if more space is needed.

Due to the linear nature of the project and the large areas of wetlands and streams located within the Preferred Alternative study corridor, total avoidance of wetlands and streams was not possible. Many riparian wetland systems associated with streams, such as the Little Pee Dee River and Lake Swamp, extend across the Preferred Alternative study corridor. Efforts were made to produce accurate wetland maps and to identify and avoid high value wetlands. Intact Carolina bays were identified from aerial photography and were designated as constraints on the GIS data layer which ensured that they would be avoided. Values were assigned to the wetland types within the study area and the wetland data layer was given an overall weighted value of 40 percent, which forced the Corridor Analysis Tool (CAT) to avoid wetlands where possible and when avoidance was not possible, to cross the lower valued wetland systems.

After the CAT identified the initial routes, the alignments were further refined to avoid wetland impacts. A field review was conducted, which provided the Agency Coordination Team (ACT) members the opportunity to view the potentially impacted wetlands within the corridors and to provide comments. Centerlines were established and wetland impacts were calculated within 400-foot wide corridors that represented approximated construction limits. Requests from the ACT for corridor modifications that would further avoid wetland impacts were investigated. These corridors and segments of corridors were presented at the ACT meetings for discussion. Votes were conducted and segments with high environmental impacts, primarily higher wetland impacts, were removed from further consideration or refined corridor alternatives that resulted in a reduction of impacts were discussed and substituted for the higher impact segments.

I-73 South

As initially proposed, the I-73 corridor would have linked directly to the coastal area at U.S. Route 17. The project was shortened to tie into the existing SC 22 to reduce the additional impacts of over 28.3 miles of new roadway to reach all the way to U.S. Route 17.

Four modifications were made to the original I-73 South Preferred Alternative based on comments made by the agencies and public during the public comment period on the I-73 South Draft EIS. Shifts were made to the alignment in the vicinity of Signode in Dillon County, which resulted in less relocations, avoided Signode (a major industrial employer in Dillon County), but increased wetland impacts by 0.6 acre. In the vicinity of the Temperance Hill community in Marion County, an overpass was added on Carroll Road which improved connectivity, and resulted in no additional wetland impacts. Two Farmland Reserve Protection Program Easements were being impacted by the original I-73 South alignment south of Mullins, in Marion County. Development was prohibited on these properties, so they had to be avoided, which resulted in additional wetland impacts at Little Sister Bay (26 acres) and in the vicinity of the McRae Farm Easement (5.5 acres). The original I-73 South alignment was also modified in the vicinity of S.C. Route 917 and Nichols Highway (S-23) in Horry County. The new alignment was moved to parallel S.C. Route 917, which avoided 9 relocations, reduced the number of times the I-73 South alignment crossed Nichols Highway, and reduced the construction costs by $6.1 million. However, it did add 18 acres of wetland impacts.

Initially, the wetland impacts for I-73 South were based on a desktop delineation and modified NWI. A wetland delineation was completed for the Preferred Alternative, which reduced the amount of wetlands actually being impacted. In addition, the initial construction footprint was 400 feet, which was reduced when preliminary design was completed, also resulting in a reduction of wetland impacts. Even with the four aforementioned modifications made to the I-73 South Preferred Alternative, the wetland impacts decreased by approximately 131 acres from the Draft EIS to the Final EIS.

Once the Final EIS and ROD were approved by the SCDOT and FHWA, a Value Engineering (VE) study was completed along with the final right-of-way plans. This resulted in a Re-evaluation of the I-73 South Final EIS. The I-73/I-95 interchange ramps in Dillon County were widened from one 16-foot travel lane to two 12-foot travel lanes, and acceleration/merge lanes were added, which added 0.34 acre of additional wetland impact. The I-73/S.C. Route 22 interchange in Horry County was also modified from a three-level design to a two-level design to reduce construction costs by $31.1 million, and also reduced wetland impacts by 7.38 acres. The overpass at Barnhill Road (S-26-309) was re-aligned to straighten the angle of the roadway and shorten the overpass bridge, which reduced construction costs, improved driver expectancy, and resulted in more predictable seismic behavior. This re-alignment resulted in an additional wetland impact of 2.66 acres. Derrick Road in Marion County was shifted farther west from the I-73 South mainline after it was found that the original alignment would not meet design criteria, which resulted in 0.04 acre less of wetland impacts. Good Luck Road (S-26-569) in the vicinity of its overpass was re-aligned to straighten out two curves, which improved design and driver expectancy. This re-alignment resulted in an additional 2.78 acres of wetland impacts. J.H.

Martin Road at Joiner Swamp Road (S-26-45) was moved farther to the east to avoid a new house that had been built in the original alignment of J.H. Martin Road, which increased wetland impacts by 1.38 acres. Overall, the design changes evaluated in the I-73 South Re-evaluation reduced wetland impacts by 0.26 acre. A written Re-evaluation of the I-73 South FEIS was performed to address these changes.

I-73 North

After the designation of the I-73 North Preferred Alternative and the public comment period, eight modifications were made to the alignment prior to the FEIS. An overpass was added on Fire Tower Road (S-35-49) to maintain connectivity between the Blenheim and Bingham communities, which increased the amount of wetland impacts by 0.25 acre. In the Hebron community, the I-73 North alignment was shifted closer to McKinnon Farm Road to avoid dividing large farm fields and move the alignment farther away from a National Register of Historic Places (NRHP) eligible home. This increased the amount of wetland impacts by 0.9 acre. Beauty Spot Road (S-35-47) was made a cul-de-sac by the original alignment. To provide connectivity in the Bennettsville area, Beauty Spot Road was moved southwest and extended to connect to U.S. Route 15/401, which resulted in no increase in wetland impacts. An overpass was added on Family Farm Road (S-35-71) to maintain connectivity that resulted in no additional wetland impacts. The S.C. Route 79 interchange was originally located in the Newtonville community, near Stubbs Town Road (S-35-263). To reduce impacts to the community, the S.C. Route 79 interchange and I-73 North alignment was shifted 6,000 feet to the east. This reduced construction costs by $3.1 million, resulted in five less relocations, and avoided a cross-generational family farm, but resulted in an additional wetland impact of 1.1 acres. The I-73 North alignment was also shifted in the vicinity of Old Wire Road (S-35-165), so that connectivity could remain between members of the same family. This reduced the wetland impact by 0.8 acre in this area. In the vicinity of Newton Road (S-35-142) and S.C. Route 79 the alignment was shifted to avoid splitting a house and barn from its adjoining farm fields, which resulted in a reduction of wetland impacts by 0.8 acre. The I-73 North alignment was impacting a new community along Spring Hill Church Road (S-35-714) and Crooked Creek in the vicinity of Ghio Road (State Route 1803). In addition, the NCDOT wanted an interchange on the I-73 North Preferred Alternative in this area. The alignment was modified to include a new interchange and re-aligned to reduce the impacts to the new community and Crooked Creek, resulting in eleven less relocations but 1.0 acre of additional wetland impacts.

Similar to I-73 South, the wetland impacts for I-73 North were initially based on a desktop delineation and modified NWI. Once the wetland delineation was completed for the Preferred Alternative, the amount of wetlands actually being impacted was reduced. In addition, the initial construction footprint was 400 feet, which was reduced when preliminary design was completed, also resulting in a reduction of wetland impacts. Overall, taking into account the eight aforementioned modifications to the I-73 North Preferred Alternative, the amount of wetland impacts were reduced by 57.1 acres from the Draft EIS to the Final EIS.

General Notes

Where practicable, 2:1 side slopes were used which reduced the roadway footprint through wetlands and other sensitive areas and thus reduced the impacts. Side slopes of 4:1 and 6:1 were required for some of the overpass ramps, and where the alignment is super-elevated. A preliminary hydraulic study using USGS topographic data was completed for the northern portion of the Preferred Alternative to establish the need for, and lengths of, bridges at perennial stream crossings, including swamps. Final hydraulic studies were conducted for the southern portion of the alignment and properly sized pipes, culverts, and bridges have been determined for water crossings. **Attached is a listing of each jurisdictional ditch, intermittent and perennial**

stream, and cross pipes installed to maintain historic hydrologic flow in wetlands. Bridge profiles follow the plan view sheet in the permit drawings.

Detailed hydraulic studies will be performed during the final roadway design phase for the northern I-73 alignment to determine bridge lengths at higher quality wetland systems, which could reduce wetland impacts for the northern portion of the alignment. As with the southern I-73 alignment, properly sized pipes and culverts, as determined by the final hydraulic study, would be installed under the roadway to maintain the historic hydrologic connections of wetlands and prevent the drainage or excessive flooding of jurisdictional areas. Additional cross pipes and culverts could be installed in new and existing causeways through wetlands to maintain sheet flow through riparian wetlands during high water events.

Wetland impacts would be minimized where wetlands would be crossed by bridges. Although the vegetation would be cleared within the construction limits and there would be temporary impacts to the hydrologic function and soil of the affected wetland, permanent impacts to bridged wetlands would be minimal. Permanent impacts would result from the decrease of vegetation beneath the bridge. Upon completion of the bridges, the temporary means of access would be removed and the area reseeded with native species to deter colonization by invasive species. The temporary access for bridge construction will consist of vegetation clearing and the use of mats or similar devices and/or barges. The hydrologic functions of the wetland would not be diminished. Currently there are 12 bridge crossings of streams with riparian wetlands where impacts would be minimized. Each wetland crossing where a bridge is warranted would be evaluated on an individual basis to determine the most practical method for constructing bridges, depending on the type and amount of wetlands to be impacted and the length, type, and geometry of the structure to be built.

Efforts to minimize wetland impacts would also be incorporated in the construction phase of the project. Construction activities would be confined within the permitted limits to prevent the unnecessary disturbance of adjacent wetland areas. During construction, potential temporary impacts to wetlands would be minimized by implementing sediment and erosion control measures to include seeding of side slopes, silt fences, and sediment basins, as appropriate. Other best management practices would be required of the contractor to ensure compliance with the policies of *23 CFR 650B.*

VI. Feasible Alternatives

Specifically describe measures ***in detail*** showing that SCDOT exhausted all feasible alternatives before filling in the wetland resources on-site. This should show that the proposed project was the least damaging alternative to water resources. Please attach a separate sheet, as an appendix, if more space is needed.

Eight design alternatives for I-73 South and three for I-73 North were developed and evaluated during the EIS process for the project. A detailed description of the various alternatives is available in the FEIS's. The Preferred Alternative was chosen as the best design alternative with the least wetland impacts, as determined with input from the ACT. A detailed analysis of all of the environmental impacts of the Preferred Alternative are presented in the FEIS's. Copies are available on request.

VII. Mitigation

Provide a description of the proposed mitigation plan. The description should provide as much information as possible, including, but not limited to: site location (attach directions and map, if offsite), affected wetland/stream and river basin, type and amount (acreage/linear feet) of mitigation proposed (restoration, enhancement, creation, or preservation), a plan view, preservation mechanism (e.g., deed restrictions, conservation easement, etc.), and a description of the current site conditions and proposed method of construction. Please attach a separate sheet, as an appendix, if more space is needed.

It has been agreed upon by the SCDOT and the USACE Charleston District that one Section 404 permit will be obtained for I-73 in South Carolina, therefore, one mitigation plan would be prepared for both projects.

The USACE mitigation SOP was used to calculate wetland and stream mitigation credits required for the construction of I-73. Wetland and stream mitigation credits were calculated using the SOP for each 11-digit Hydrologic Unit Code (HUC) in which the impacts occur.

A wetland delineation was completed for the Preferred Alternative for both the southern and northern portions of I-73 and submitted to the USACE. After numerous field reviews and meetings for both portions, USACE approval has been obtained. A copy of the approximation approval letters for the project are attached. A Request for Jurisdictional Determination of the field delineation for the Re-evaluation portions of the southern portion of I-73 was submitted to the USACE in June 2010. Approval for the Re-evaluation areas has not yet been received.

The SOP guidance has been applied to the impacts of both the approved and the submitted delineated areas and the number of required wetland and stream mitigation credits has been calculated. Areas such as non-jurisdictional ditches and ponds were not included in the mitigation calculations although the impacted acreage for these areas is included in the total impacted acreage and shown in Section IV.1 and 3 above. A number of non-jurisdictional ponds were considered to be solely agricultural in nature and were removed from the drawings and the acreage calculations. Criteria for determining the agricultural status included such factors as excavation in uplands, lack of remnant wetlands or other drainage features in the immediate vicinity, lack of hydric soil characteristics, and historic information from soil surveys and aerial photography. Non-jurisdictional wetlands, however, were included in the mitigation calculations to satisfy the mitigation requirement for secondary impacts as discussed by the ACT and the USACE. Additional temporary clearing at the bridges, up to forty five feet from the bridge parapet on one or both sides, has been included in the total impacted acreage to allow for construction access. A total of 4,178.13 wetland credits and a total of 18,220.0 stream credits will be required. A copy of the USACE Charleston District Compensatory Mitigation SOP worksheets is attached.

The proposed Conceptual Mitigation Plan includes three sites which, when combined, address the I-73 mitigation needs of SCDOT.

The first site, Joiner Bay, is a landscape scale wetlands restoration project with multiple wetland types matching the various impacted habitats along the I-73 corridor. The site is located two miles from the I-73 Preferred Corridor in western Horry County within the same watershed containing the majority of the wetland impacts.

The second site, Brittons Neck, is a coastal plain stream restoration site located in the watershed covering the northern section of the I-73 Preferred Corridor. The integration of these two mitigation projects provides significant ecological benefits by increasing the scale of conservation at one location.

The third site is the Sandy Island Mitigation Bank. SCDOT will utilize the remaining 1,500 credits as part of this Conceptual Mitigation Plan.

VIII. Biological/ Habitat Assessment

Present a detailed report of the habitat and existing condition of that habitat. The report should include a detailed list of all State and Federal Threatened and Endangered Species and whether the species of concern was present and/ or if their habitat was present. Please attach a separate sheet, as an appendix, if more space is needed.

Biological Assessments (BAs) were completed for both the northern and the southern portions of I-73 and a determination of no effect was made for both. Copies of both the northern and southern concurrence letters from the USFWS are attached. As discussed in the Project Commitments for the northern portion of I-73, SCDOT will implement a seasonal moratorium pertaining to the shortnose sturgeon in the Little PeeDee River, for all in-water work between February 1 and April 30 of each year. In addition, work will not impede more than fifty percent of the channel between April 30 and February 1. No special measures will be employed outside this moratorium except for normal Best Management Practices. A supplemental BA that was prepared for the design modifications associated with the value engineering study and development of the right-of-way plans is currently under review.

Renée G. Shirchum-Bowles 08/ 26 / 2010

SCDOT Authorized Agent's Signature **Date**

I-73 Project Summary for Permitting

I. Introduction

This summary provides a brief synopsis of the I-73 project in South Carolina to facilitate the Section 404/401 permitting process. For more detailed information regarding the project, please refer to the *Interstate 73 Final Environmental Impact Statement: From I-95 to the Myrtle Beach Region* (I-73 South) and the *Interstate 73 Final Environmental Impact Statement: From I-95 to Future Interstate 74 in North Carolina* (I-73 North).

II. Project Description and Purpose

The I-73 project is a national highway corridor that would provide a link from Michigan to South Carolina. The national I-73 corridor begins at Sault Ste. Marie, Michigan, proceeds through portions of Ohio, West Virginia, Virginia, North Carolina, and terminates near Myrtle Beach, South Carolina. This corridor was designated as a high priority corridor by the U.S. Congress, and is currently ranked number five on the National Highway System's High Priority Corridors list.

As part of this national project, the South Carolina Department of Transportation (SCDOT), in association with the Federal Highway Administration (FHWA), are working together to construct the portion of I-73 in South Carolina. For this permit application, I-73 begins at the North Carolina state line and extends throughout the northeastern corner of South Carolina, before terminating at S.C. Route 22 in Horry County, South Carolina (refer to Figure 1, page 2). To reach a logical terminus at future I-74, approximately four miles of the project is located in North Carolina. Due to this, the North Carolina Department of Transportation (NCDOT) and the SCDOT agreed to collaborate on the I-73 project. Permitting for the portion of I-73 in North Carolina will be completed by NCDOT and submitted to the USACE Wilmington District for approval.

Purpose and Need of I-73 in South Carolina

The overall purpose of the I-73 projects in South Carolina is to provide an interstate link between the I-73/I-74 Corridor in North Carolina to the Myrtle Beach region in South Carolina, to serve residents, businesses, and travelers while fulfilling

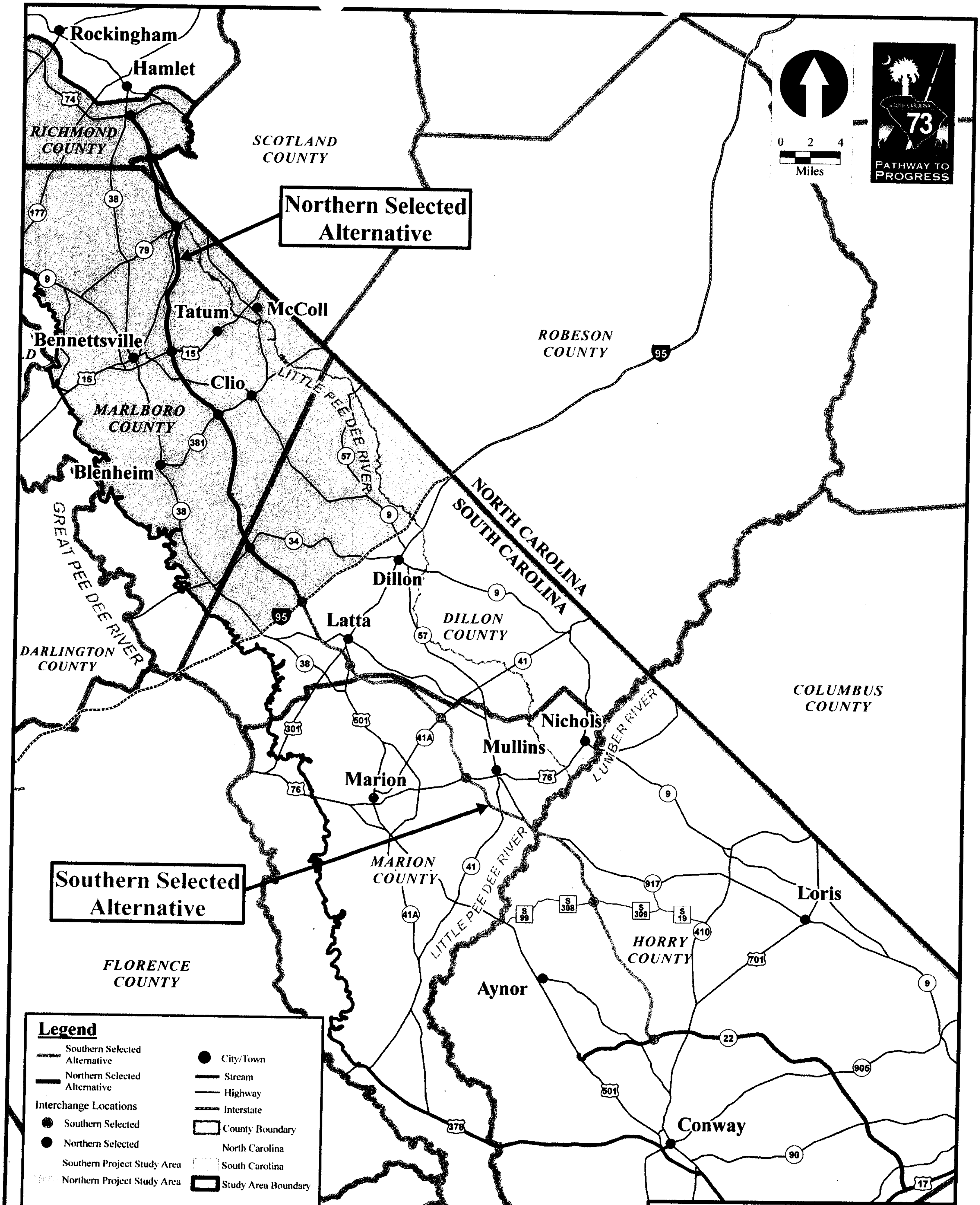


Figure 1: Selected Alternative

congressional intent in an environmentally sensitive manner. The I-73 project's primary needs are to provide system linkage and enhance economic development.

The I-73 projects will improve national and regional connectivity by providing a link between the I-73/I-74 National Corridor and the Myrtle Beach region. In addition, they will help enhance economic development opportunities and tourism in northeastern South Carolina, which has some of the highest unemployment levels in the state. Secondary needs differ between I-73 North and I-73 South, with the secondary needs of I-73 North being to improve access for tourism into the area, increase safety on existing roads, and multimodal planning if future light rail were to go through the area. The secondary needs for I-73 South include facilitating hurricane evacuation from the coast, relieving local traffic congestion, and multimodal planning.

Location of the I-73 Projects in South Carolina

The project study areas are located within portions of Richmond and Scotland Counties in North Carolina, and Marlboro, Dillon, Marion, and Horry Counties in South Carolina (refer to Figure 1, page 2). Originally, the project was developed as two single and complete projects, I-73 North, which extends from future I-74 to I-95, and I-73 South, which extends from I-95 to S.C. Route 22. The terminus of each project at I-95 provides a logical terminus and independent utility for each project. The Section 404/401 wetland permit includes the entire I-73 project in South Carolina. The four-mile segment of the project located in North Carolina will be permitted separately by NCDOT. For the purpose of this permit application, the portions of the two I-73 projects will be addressed as one project that encompasses all of I-73 in South Carolina.

I-73 Project Description

The I-73 project is 75.3 miles in length and begins at the North Carolina border, just east of the I-74 interchange with State Route 38 (refer to Figure 1, page 2). The alignment proceeds in a southerly direction through Marlboro County, lying east of Bennettsville and west of Clio. It crosses into Dillon County, and proceeds in a southeasterly direction west of Latta before traversing into Marion County. The alignment lies between Marion and Mullins, and crosses the Little Pee Dee River into

Horry County, where it lies east of Aynor going in a southeasterly direction before connecting to S.C. Route 22 via a controlled interchange. Once I-73 South is constructed, S.C. Route 22, which continues to North Myrtle Beach, would be upgraded to interstate standards, providing a smooth transition between I-73 to S.C. Route 22.

I-73 will be a high-speed, fully controlled-access roadway that will require using interchanges for access. The mainline would be a four-lane divided facility, with two travel lanes on each side of a median, and a five-foot high barrier fence on the outside to create a physical barrier to the interstate to control access (refer to Figure 2, page 5). Once traffic volumes increase to a point that additional lanes are needed to maintain an acceptable level of service, the mainline would be widened to six lanes, three travel lanes in each direction, with widening occurring in the median. The selected alternative for the I-73 project in South Carolina will have interchanges at S.C. Route 79, U.S. Route 15/401, S.C. Route 381, S.C. Route 34, I-95, U.S. Route 501, S.C. Route 41A, U.S. Route 76, S-308, and S.C. Route 22. Frontage roads will provide access to properties, while overpasses will be constructed over the interstate to maintain existing traffic patterns in the project study area. An additional area was provided within the right-of-way along the mainline of I-73 to accommodate a footprint for future light rail if it were to be constructed in the area. The right-of-way would be 300 feet wide, except for where frontage roads are needed, in which the right-of-way would be 400 feet in width.

III. I-73 Project Alternative Development

Alternatives were developed through the use of existing data from the project study area, and by input from state and federal agencies, stakeholders, and the public. Below is a discussion of how the alternatives were developed for both I-73 North and I-73 South. For more detailed information, please refer to Chapter 2 of I-73 North and I-73 South, as well the *Alternative Development Technical Memorandums*.

The first step in developing alternatives for the I-73 project was to define and prioritize the issues of concern in the project study area. This was accomplished through the development of alternative evaluation categories, which were evaluated at different levels of detail over the alternative development process, from a very broad level at the beginning to a very detailed level at the end. These alternative evaluation categories, which included a variety of social, environmental, historic, economic, and engineering considerations, were used to satisfy the Purpose and Need of the project while minimizing impacts to the environment. Agencies provided input on the alternative evaluation categories, as part of the Agency Coordination Team (ACT). The ACT was composed of representatives from the FHWA, National Oceanic and Atmospheric Administration, National Marine Fisheries Service (NOAA Fisheries), Natural Resources Conservation Service (NRCS), United States Army Corps of Engineers (USACE), United States Coast Guard (USCG), United States Environmental Protection Agency (USEPA), United States Fish and Wildlife Service (USFWS), South Carolina Department of Archives and History (SCDAH), South Carolina Department of Commerce (SCDOC), South Carolina Emergency Management Division (SCEMD), South Carolina Department of Health and Environmental Control (SCDHEC), SCDHEC Office of Ocean and Coastal Resource Management (SCDHEC-OCRM), South Carolina Department of Natural Resources (SCDNR), SCDOT, and South Carolina Department of Parks, Recreation, and Tourism (SCPRT). For a summary of the ACT meetings, please refer to Chapter 4 of I-73 South and I-73 North EISs.

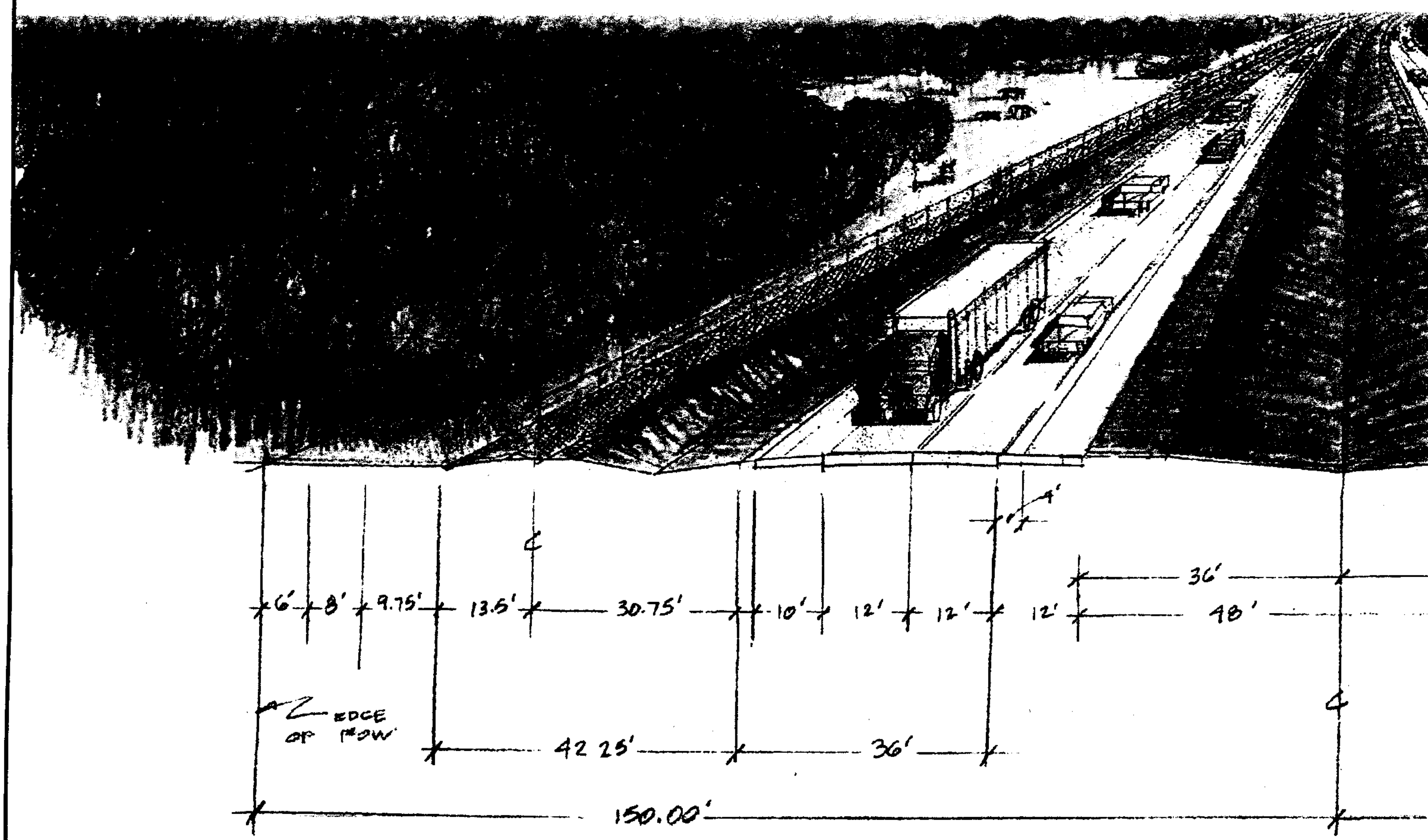
Data was gathered in the form of Geographic Information Systems (GIS) mapping from various local, regional, and state entities for the project study area. GIS data was verified using other published data sources. Over 50 GIS layers were separated into four categories and assigned a ranking (percentage weight). Each feature within a layer was assigned a numerical value, on a scale of one to ten, with ten being the most valuable. All of the layers were included in the Corridor Analysis Tool (CAT). The CAT used the GIS data to generate potential roadway corridors and analyze the corridors quickly, which allowed more time to be spent on interpretation, refinement, and comparison of potential corridors. For more detailed information on how the CAT tool works, please refer to the *GIS and Data Collection Activities Technical Memorandum.* Some of the GIS data layers were designated as constraints by the ACT and were to be avoided by the potential corridors, which included the following:

- Intact Carolina bays;
- Mitigation banks;
- Known locations of federal and state protected species;
- National Register of Historic Places (NRHP) listed, eligible, or potentially eligible sites;
- SCDNR heritage preserves;

- Publicly owned parks;
- Known hazardous material sites;
- Landfills;
- Mines/geologic features;
- Airports;
- Schools; and,
- Cemeteries.

The GIS data layers were broken into four main categories and given overall percentage importance values that totaled 100 for the CAT program. Each category was assigned a value based upon the relative importance given to each category: environmental (50), roadways (10), infrastructure (20), and demographic/socioeconomic (20). These category weightings and constraints were then programmed into the CAT and used to generate preliminary Build Alternatives. Beginning points and endpoints were set, and the CAT would generate a corridor line that would be of the least impact while avoiding constraints. In addition, the ACT had the opportunity to manually draw alternatives on a map that would be quantified, as well as set points for corridor evaluation with the CAT. Overall, the CAT developed 141 preliminary Build Alternatives for I-73 South and 1,896 preliminary Build Alternatives for I-73 North. The preliminary Build Alternatives were screened first using the Purpose and Need, and then by potential impacts to resources in the project study area. This narrowed the preliminary Build Alternatives to ten for I-73 South and six for I-73 North.

These Build Alternatives were presented as 2,500-foot corridors to the public during public information meetings and stakeholder working group meetings for input. (For a summary of public involvement for I-73, please refer to Chapter 4 of I-73 South and I-73 North EISs.) Based on the input received from the public, stakeholders, as well as the ACT, the Build Alternatives were further refined and the corridors were narrowed to the right-of-way limits for each Build Alternative. Additional scrutiny was given to each Build Alternative and this information was presented to the ACT (refer to Tables 1 and 2 for I-73 South and I-73 North, respectively), which designated eight Reasonable Alternatives for I-73 South and three Reasonable Alternatives for I-73 North. Based on a comparison of the information available, as well as ACT and public input, a Preferred Alternative was designated by SCDOT and FHWA for both I-73 North and I-73 South. The Draft EIS for each was published and available for review in numerous places



I-73 INTERIM - NO FRONTAGE RD. AT LEFT / SPACE

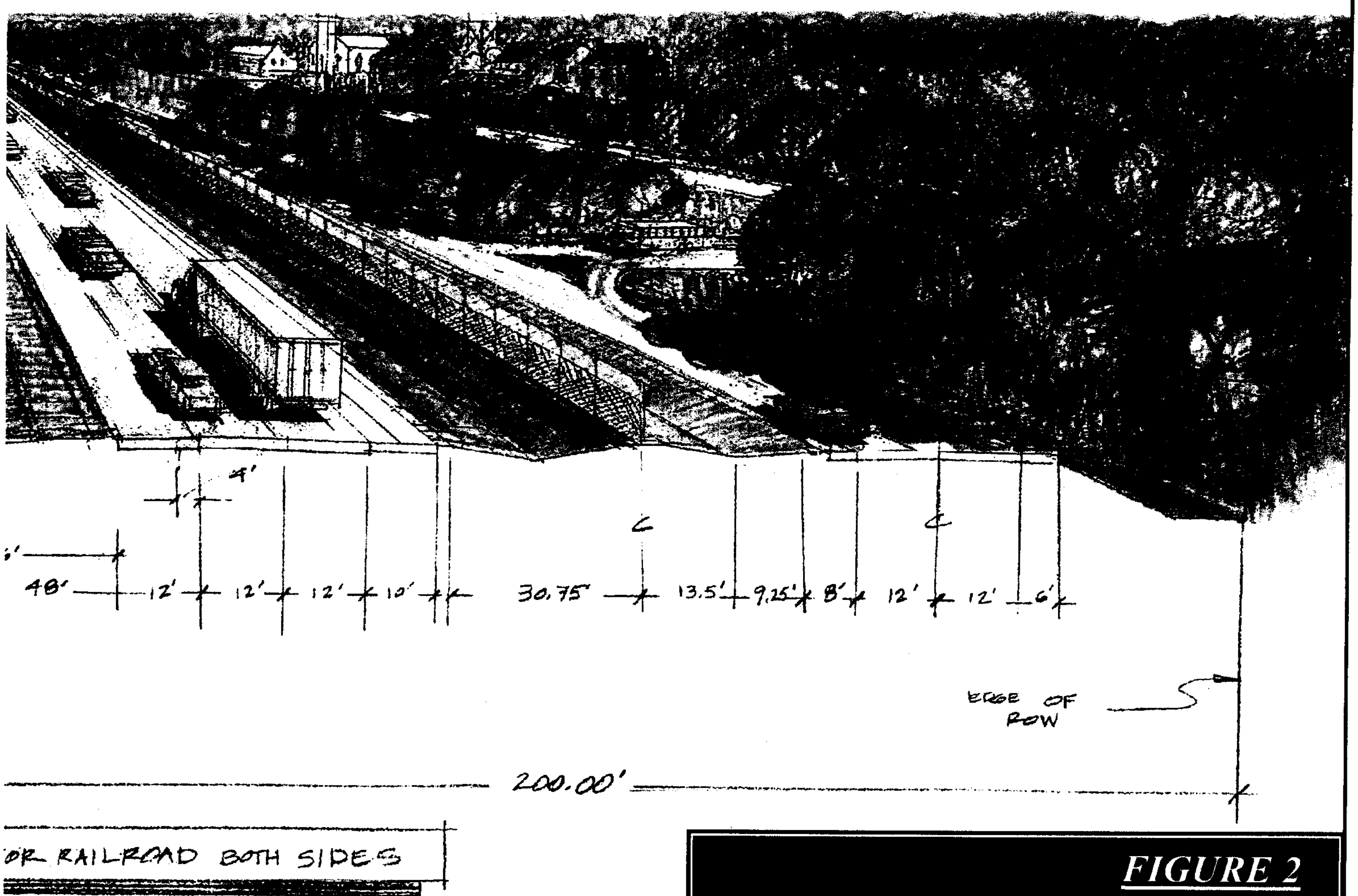


FIGURE 2

INTERIM TYPICAL SECTION
FRONTAGE ROAD ON ONE SIDE
SPACE FOR RAILROADS ON BOTH SIDES

Table 1
REASONABLE ALTERNATIVES MATRIX
I-73 South

	CATEGORY	UNIT OF MEASURE	ALTERNATIVE 1	2	(Preferred) 3	4	5	6	7	8
PURPOSE AND NEED	System Linkage		**Yes**	Yes	**Yes**	Yes	**Yes**	Yes	**Yes**	Yes
	Economic Development		**Yes**	Yes	**Yes**	Yes	**Yes**	Yes	**Yes**	Yes
	Hurricane Evacuation		**Yes**	Yes	**Yes**	Yes	**Yes**	Yes	**Yes**	Yes
	Local Traffic Congestion		**Yes**	Yes	**Yes**	Yes	**Yes**	Yes	**Yes**	Yes
	Multimodal Planning		**Yes**	Yes	**Yes**	Yes	**Yes**	Yes	**Yes**	Yes
ENGINEERING CRITERIA	Length	Miles	**44.9**	47.7	**44.2**	42.6	**48.3**	43.6	**46.0**	44.3
	Design Criteria	Meets/Does Not Meet	**Meets**	Meets	**Meets**	Meets	**Meets**	Meets	**Meets**	Meets
	Constructability	Scale 1-6 (1 highest)	**4**	3	**1**	6	**3**	1	**4**	4
	Construction Cost	Year 2011 Dollars (Billions)	**1.492**	1.547	**1.290**	1.392	**1.430**	1.406	**1.350**	1.595
NATURAL FEATURES	Threatened and Endangered Species	Yes (#) / No	**No**	No	**No**	No	**No**	No	**No**	No
	Species of Concern	Yes (#) / No	**Yes (1)**	No	**No**	Yes (1)	**No**	No	**No**	Yes (1)
	Wetlands	Acreage	**417.5**	443.6	**384.1**	497.0	**412.9**	413.1	**492.1**	448.6
	Fill	Acreage	**372.8**	386.6	**352**	453.2	**372.9**	365	**453.0**	386.8
	Bridge	Acreage	**44.8**	57.0	**32**	43.9	**40.1**	48	**39.2**	61.8
	Wetland Quality	Value	**2,919.4**	2,869.4	**2,486.1**	3,212.4	**2,816.1**	2,588.4	**3,105.8**	2,976.8
	Fill	Value	**2,556.0**	2,408.5	**2,228.5**	2,847.0	**2,481.4**	2,212.5	**2,769.3**	2,486.1
	Bridge	Value	**363.5**	460.9	**257.6**	365.4	**334.7**	375.9	**336.4**	490.7
	Streams									
	Total Crossings	# of Crossings	**60**	62	**58**	45	**56**	64	**41**	66
	Perennial	# (Linear Feet)	**52 (18,086)**	54 (18,052)	**48 (16,243)**	35 (12,891)	**49(15,878)**	53 (18,420)	**32 (10,863)**	57(20,260)

	Water Quality									
	Outstanding Resource Water	# of Crossings	10	10	5	10	10	5	9	10
	303(d) Impaired	# of Crossings	3	6	3	6	2	7	5	7
	Habitat	Unique	No	No	No	No	No	No	No	No
	Uplands	Acreage	2,139	2,210	1,923	1,884	2,154	1,979	1,899	2,194
	Floodplains	Acreage	173	193	94	321	176	111	323	191
MAN-MADE FEATURES	Hazardous Material Sites	#	2	3	1	2	2	4	2	3
	Parks and Wildlife Refuges	Yes (#) / No	0	0	1	0	0	1	0	0
	Historical Structures	Yes (#) / No	1 Visual	2 Visual	1 Visual	1 Direct	1 Visual	2 Visual	1 Visual, 1 Direct	2 Visual
	High Potential Area for Archaeological Sites	Acreage	1,086	1,144	1,032	991	1,149	1,028	1,057	1,078
	Noise (R= Residential, C= Church)	#	18R, 1C	19R	37R	17R	22R, 1C	41R	20R	15R
	Farmland	Acreage	1,993	2,009	1,708	1,717	2,136	1,835	1,781	2,155
	Prime	Acreage	1,046	1,319	1,094	868	1,344	1,147	1,036	1,159
	Unique	Acreage	0	0	0	0	0	0	0	0
	Statewide Important	Acreage	947	690	614	849	792	688	745	996
SOCIOECONOMIC ISSUES	Community Impacts	Scale 1-6 (1 least impact)	5	3	2	3	2	4	1	5
	Total Relocations	#	121	92	88	74	98	80	51	116
	Residential Relocations	#	109	82	81	61	93	68	45	98
	Commercial Relocations	#	12	10	7	13	5	12	6	18
	Environmental Justice	Yes / No	No	No	No	No	No	No	No	No
INFRASTRUCTURE	Airports	#	0	0	0	0	0	0	0	0
	Fire Stations	#	0	0	0	0	0	0	0	0
	Schools	#	0	0	0	0	0	0	0	0
	Churches	#	0	3	0	0	0	3	0	3
	Cemeteries	#	0	0	0	0	0	0	0	0

Table 2
Three Reasonable Alternatives Matrix for I-73 North

	Category	Unit of Measure	Alternative 1	Alternative 2 (Preferred)	Alternative 3
Purpose And Need	System Linkage		Yes	Yes	Yes
	Economic Development		Yes	Yes	Yes
	Improved Access for Tourism		Yes	Yes	Yes
	Increased Safety on Existing Roads		Yes	Yes	Yes
	Multimodal Planning		Yes	Yes	Yes
Engineering Criteria	Length	Miles	40.6	36.8	37.2
	Design Criteria	Meets/Does Not Meet	Meets	Meets	Meets
	Constructability	Ranking	1	1	1
	Construction Cost (year 2012)	$ Millions	1,210	1,080	1,190
Natural Features	Threatened and Endangered Species	Yes (#) / No	No	No	No
	Species of Concern	Yes (#) / No	No	No	No
	Wetlands	Acreage	167.7	114.3	116.0
	Fill	Acreage	161.9	107.0	114.4
	Bridge	Acreage	5.8	7.3	1.6
	Wetland Quality	Value	1,205.2	768.1	729.3
	Fill	Value	1,157.6	736.2	714.6
	Bridge	Value	47.6	31.9	14.7
	Streams				
	Total Crossings	# of Crossings (Linear Feet)	15 (4,566)	24 (8,143)	24 (10,062)
	Perennial	# (Linear Feet)	6 (1,666)	10 (3,778)	7 (3,555)
	Intermittent	# (Linear Feet)	9 (2,900)	14 (4,365)	17 (6,507)
	Water Quality				
	Outstanding Resource Water	# of Crossings	0	0	0
	303(d) Impaired (2006 Draft List)	# of Crossings	0	0	0
	Habitat	Unique	No	No	No
	Uplands (Fill Only)	Acreage	1,952.6	1,800.8	1,845.6

Man-Made Features	Hazardous Material Sites	#	1 Auction Water - Hamlet	1 Auction Water - Hamlet	2 Auction Water - Hamlet & Red Bluff Grocery
	Parks and Wildlife Refuges	Yes (#) / No	No	No	No
	Historical Structures	#	1 Visual Impact S-18 House	0	1 Direct Impact McLaurin House
	High Potential Area for Archaeological Sites	Acreage	993.0	804.9	1297.9
	Noise (R= Residential)	#	6 R	3 R	2 R
	Farmland	Acreage	1,705	1,505	1,582
	Prime	Acreage	824	805	961
	Unique	Acreage	0	0	0
	Statewide Important	Acreage	881	700	621
	Poultry Farm	#	0	0	1
	Hog Farm	#	0	0	0
Socioeconomic Issues	Community Impacts	#	7 Aaron's Temple, Bennettsville, Blenheim, Brightsville, Chavistown, Hamlet, Salem	8 Adamsville, Bennettsville, Brightsville, Clio, Dunbar, Hamlet, Hebron, Newtonville	6 Adamsville, Bennettsville, Brightsville, Clio, Hamlet, Newtonville
	Total Relocations	#	71	41	40
	Residential Relocations	#	69	35	36
	Commercial Relocations	#	2	6	4
	Environmental Justice	# of Block Groups	7	8	10
Infrastructure	Airports	#	0	0	0
	Fire Stations	#	0	0	0
	Schools	#	0	0	0
	Churches	#	0	0	1 Community House of Prayer
	Cemeteries	#	0	0	0
	Railroad Crossings	#	4	4	5
	Gas Line Crossings	#	3	2	1

throughout the project study area as well as at the I-73 project website. Public hearings were held, with 1,443 people attending the I-73 South public hearings providing 861 comments, and 454 people attending the I-73 North public hearings, leaving 116 comments.

Modifications were made to the Preferred Alternatives based on comments from the public and the ACT. Field work was performed to delineate wetlands, determine whether any federally protected species or their suitable habitat was present, and to evaluate whether any NRHP-eligible or potentially eligible historic resources were present within the corridor of the Preferred Alternative. The potential impacts were re-quantified for the Preferred Alternatives and are shown in Table 3 for I-73 South and Table 4 for I-73 North. As shown in Table 3, the impacts from I-73 South included 313 acres of potential wetland impacts and 3,860 linear feet of potential stream impacts. In addition, 13 residences would be potentially impacted by noise and 78 relocations would be needed. To minimize the number and extent of crossings of the Little Pee Dee River, the alignment was moved to parallel the existing S.C. Route 917, which would impact the Little Pee Dee Heritage Preserve. However, the impact to this SCDNR-owned property was mitigated. I-73 North would potentially impact 57.2 acres of wetlands and 14,994 linear feet of streams. One hazardous material site would be impacted, as well as one historic/Section 4(f) property, the Beauty Spot Motorcourt Office. A Section 4(f) evaluation has been completed for this impact and a Memorandum of Agreement has been signed between the State Historic Preservation Office and SCDOT, which was included in the I-73 North Final EIS. Eight residences and one business would be potentially impacted by noise, and 28 relocations would be required for I-73 North. For detailed information about the project study area and the potential impacts to resources, please refer to Chapter 3 of I-73 South and I-73 North EISs.

A Final EIS was issued for both I-73 South and I-73 North, and was distributed throughout the project study area, to ACT members, and was available online at the I-73 Project Website. A Record of Decision (ROD) was issued for I-73 South on February 8, 2008, while the ROD for I-73 North was issued on October 22, 2008. A written Re-evaluation of the I-73 South FEIS was performed for I-73 to address design and value-engineering changes. This document was approved in May 2010.

Table 3
PREFERRED ALTERNATIVE IMPACT MATRIX
I-73 South

	CATEGORY	UNIT OF MEASURE	PREFERRED ALTERNATIVE (Alternative 3)
PURPOSE AND NEED	System Linkage		Yes
	Economic Development		Yes
	Hurricane Evacuation		Yes
	Local Traffic Congestion		Yes
	Multimodal Planning		Yes
ENGINEERING CRITERIA	Length	Miles	43.5
	Design Criteria	Meets/Does Not Meet	Meets
	Constructability	Scale 1-6 (1 highest)	1
	Construction Cost (Year 2011)	Year 2011 Dollars (Billions)	1.290
RAL FEATURES	Threatened and Endangered Species	Yes (#) / No	No
	Species of Concern	Yes (#) / No	No
	Wetlands	Acres	313.0
	Fill	Acres	288.8
	Bridge	Acres	24.2
	Wetland Quality	Value	1,510.8
	Fill	Value	1,378.9
	Bridge	Value	131.9
	Streams		
	Total Crossings	# of Crossings (Linear Feet)	22 (3,860)

	Perennial	# of Crossings (Linear Feet)	13 (3,155)
	Intermittent	# of Crossings (Linear Feet)	9 (705)
	Water Quality		
	Outstanding Resource Water	# of Crossings	3
	303(d) Impaired	# of Crossings	0
	Habitat	Unique	No
	Natural Upland Communities	Acres	576.5
	Floodplains	Acres	114.2
MAN-MADE FEATURES	Hazardous Material Sites	#	0
	Parks and Wildlife Refuges	Yes (#) / No	1
	Historical Structures	Yes (#) / No	0
	Noise (R= Residential)	#	13R
	Farmland	Acres	1,915
	Prime	Acres	1,186
	Statewide Important	Acres	729
SOCIOECONOMIC ISSUES	Community Impacts	Scale 1-6 (1 least impact)	2
	Total Relocations	#	78
	Residential Relocations	#	74
	Commercial and Government Facility Relocations	#	4 (3C, 1G)
	Environmental Justice	Yes / No	No
INFRASTRUCTURE	Airports	#	0
	Fire Stations	#	0
	Schools	#	0
	Churches	#	0
	Cemeteries	#	0

C= Commercial, G=Government

Table 4

Preferred Alternative Impact Matrix for I-73 North

	Category	Unit of Measure	Preferred Alternative (Alternative 2)
Purpose And Need	System Linkage		Yes
	Economic Development		Yes
	Improved Access for Tourism		Yes
	Increased Safety on Existing Roads		Yes
	Multimodal Planning		Yes
Engineering Criteria	Length	Miles	36.6
	Design Criteria	Meets/Does Not Meet	Meets
	Constructability	Ranking	1
	Construction Cost (year 2013)	$ Millions	1,125
Natural Features	Threatened and Endangered Species	Yes (#) / No	No
	Species of Concern	Yes (#) / No	No
	Wetlands	Acreage	57.2
	Fill	Acreage	52.9
	Bridge	Acreage	4.3
	Wetland Quality	Value	285.9
	Fill	Value	265.5
	Bridge	Value	20.4
	Streams (Jurisdictional)		
	Total Crossings	# of Crossings (Linear Feet)	23 (14,994)
	Perennial	# (Linear Feet)	11 (5,188)
	Intermittent	# (Linear Feet)	12 (9,806)
	Water Quality		
	Outstanding Resource Water	# of Crossings	0
	303(d) Impaired (2008 Draft List)	# of Crossings	0
	Habitat	Unique	No
	Uplands (Fill Only)	Acreage	923.4

Man-Made Features	Hazardous Material Sites	#	1
			Auction Water - Hamlet
	Parks and Wildlife Refuges	Yes (#) / No	No
	Historical Structures	#	1 (Beauty Spot Motor Court Office Building)
	Potentially Eligible Archaeological Sites	#	4
	Noise (R= Residential, B= Business)	#	8 R, 1 B, and Beauty Spot Cemetery
	Farmland	Acreage	1,578
	Prime	Acreage	849
	Unique	Acreage	0
	Statewide Important	Acreage	729
	Poultry Farm	#	0
	Hog Farm	#	0
Socioeconomic Issues	Direct Community Impacts	#	11
			Adamsville, Bennettsville, Bingham, Brightsville, Clio, Dunbar, Hamlet, Hebron, Lester, Newtonville, Tatum
	Indirect Community Impacts	#	11
			Adamsville, Bennettsville, Blenheim, Brightsville, Chavistown, Clio, Dunbar, Hamlet, Hebron, McColl, and Minturn
	Total Relocations	#	28
	Residential Relocations	#	24
	Commercial Relocations	#	4
	Environmental Justice	# of Block Groups	8
Infrastructure	Airports	#	0
	Fire Stations	#	0
	Schools	#	0
	Churches	#	0
	Cell Phone Towers	#	1
	Cemeteries	#	0
	Railroad Crossings	#	4
	Gas Line Crossings	#	2

IV. I-73 Project Commitments

As part of the I-73 Project, commitments were made to minimize impacts where possible. Below is a list of project commitments made for the entire I-73 Project, as well as some specific to I-73 South and I-73 North.

Overall I-73 Project Commitments

- A minimum design speed of 45 miles per hour, where appropriate, is necessary to be maintained in the construction area in order to minimize undue traffic backups and delays.

- In the event that in the future a rail facility is constructed, bridges and overpasses would be retrofitted to accommodate the increased height and length that would be needed to meet installation criteria for rail, while the railroad would be located out of the existing right-of-way at the interchanges.

- Relocations will be conducted in accordance with the *Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970,* as amended. Relocation resources will be available to all relocates without discrimination. A conceptual relocation study was completed, but relocations will be evaluated at a more detailed level during final design.

- Bridges constructed to elevate roadways over the interstate would have 10-foot shoulders, which would accommodate pedestrian and bicyclists safely.

- In the event that previously unknown cultural resources are discovered during construction, the resources will be handled according to 36 CFR §800.11 in coordination with the SHPO and appropriate Tribal Historic Preservation Offices.

- Sufficient upland areas that could be utilized for borrow activities are present in close proximity to the Preferred Alternative alignment. Therefore, it appears that impacts to wetlands due to the borrowing activities could be avoided. Wetland delineations would be performed at the borrow pit sites and potential impacts to federally listed species and cultural resources would be evaluated prior to beginning excavation, in accordance with the SCDOT Engineering Directive (EDM – *Borrow Pit Location and Monitoring*).

- Should previously unknown hazardous material contamination be discovered as the project moves forward, the contamination would be removed and properly disposed of prior to the initiation of construction activities at that site.

- A Spill Prevention, Control, and Countermeasures Plan will be developed to address potential impacts from construction activities.

- The results of the noise analyses will be given to local governments to aid in future planning in their respective areas.

- The contractor will comply with applicable federal, state, county, and other local air pollution regulations during the construction of the project.

- Where appropriate, pipe and culvert bottoms would be recessed below the bottom of perennial stream channels to allow movement of aquatic species through the structure.

- Best Management Practices in accordance with local, state, and federal guidelines will be incorporated during the design and construction of the project to minimize impacts to water quality and wetlands.

- The use of pipes or culverts and the final bridge lengths would be determined after performing detailed hydraulic studies during the final design phase and would be dependent on several factors, such as watershed size, and the presence of FEMA regulated floodplains and floodways.

- Where practicable, 2:1 side slopes were used that reduced the roadway footprint through wetlands and other sensitive areas and thus reduced the impacts.

- Construction activities would be confined within the permitted limits to prevent the unnecessary disturbance of adjacent wetland areas.

- If temporary roads in wetlands are used for bridge construction, the fill material would be removed and the areas reseeded with native riparian species seed mixes.

- Properly sized pipes and culverts, as determined by the final hydraulic study, would be installed under the roadway to maintain the historic hydrologic connections of wetlands and prevent the drainage or excessive flooding of jurisdictional areas.

- A Section 404 permit from the USACE and a Section 401 Water Quality Certification from SCDHEC will be obtained for unavoidable impacts to wetlands and other jurisdictional waters of the United States and mitigation will be completed for these impacts.

- Modifications, such as the installation of coffer dams in stream channels in order to construct footings for bridge pilings, might be required. However, if these modifications were needed they would be temporary and would be removed upon completion of construction and the natural grade of the wetland restored and reseeded.

- During construction, potential temporary impacts to wetlands would be minimized by implementing sediment and erosion control measures to include seeding of side slopes, silt fences, and sediment basins, as appropriate. Other best management practices would be required of the contractor to ensure compliance with the policies of 23 CFR §650B.

- Measures will be taken to reduce the likelihood of importing invasive species.

<u>I-73 South Specific Project Commitments</u>

  - To provide an interstate link between I-95 and the Myrtle Beach region to serve residents, businesses, and tourists while fulfilling congressional intent in an environmentally responsible and community sensitive manner.

  - SCDOT will implement a seasonal moratorium pertaining to the shortnose sturgeon, in the Little Pee Dee River, for all in-water work between February 1 and April 30 of each year. Work will not impede more than fifty percent of the channel for the remainder of the year. No special measures will be employed outside this moratorium except for normal Best Management Practices.

- The Preferred Alternative was shifted to travel along the edge of the Zion community to avoid impacting the Zion Grocery, which serves as an important community store and meeting place. An interchange at S.C. Route 41A would be located west of the community center, and the right-of-way limits for the interchange would have potentially impacted the Zion Grocery. However, design considerations will be incorporated into the final interchange design to ensure this important local landmark is not impacted.

<u>I-73 North Specific Project Commitments</u>

- To provide an interstate link between I-95 and I-74 to serve residents, businesses, and tourists while fulfilling congressional intent in an environmentally responsible and community sensitive manner.

- In the event I-73 is tolled, additional NEPA analysis would be performed.

- Detailed archaeological investigations will be completed on the Preferred Alternative in North Carolina prior to purchase of right-of-way.

- Phase II archaeological testing will be performed on four sites in South Carolina determined to be potentially eligible for listing on the NRHP. If any of these sites are found to be eligible for listing, then avoidance will be evaluated and/or mitigation will be performed.

- Mitigation for the impacts to the former Beauty Spot Motor Court Office will be performed in accordance with the terms in the signed Memorandum of Agreement between the SHPO and SCDOT.

- The Preferred Alternative will cross five major riparian wetland systems (Little Reedy Creek, unnamed tributary to Little Reedy Creek, Hagins Prong, Cottingham Creek, and Beverly Creek) primarily on structure.

Hydraulic studies during final design will determine whether the minor crossings of ten unnamed tributaries of Crooked Creek will be piped or culverted.

- In the event that a geodetic control monument would be impacted, notification would be provided to NOAA no less than 90 days in advance of such activities in order to plan for their relocation.

V. I-73 South Re-evaluation

As the right-of-way plans were being developed for I-73 South, there were minor changes to improve the design of the alignment. A re-evaluation was completed to determine whether a supplemental EIS needed to be prepared. In addition, a value engineering (VE) study was completed that also affected the final design of the I-73 South alignment. In 1995, Congress passed a law that included a requirement that VE studies be completed on projects on the National Highway System that would have an estimated cost of $25 million or more, or on federal-aid projects where there would be a great potential to reduce costs. The objectives of a VE study are to find and eliminate unnecessary costs and construction time in a project while maintaining environmental commitments and safe operations. The VE study team was composed of engineers that did not originally work on I-73 South to review the right-of-way plans. Based on their recommendations, SCDOT incorporated three design changes to the I-73 South alignment. In addition, the design team for I-73 South also proposed some changes to improve the alignment, three of which were accepted by the SCDOT. For further information, refer to the I-73 South Re-evaluation.

Based on the findings of the I-73 South Re-evaluation, no new significant impacts would result from the proposed design changes, and FHWA concurred with this finding on May 7, 2010. The following is a brief discussion of the design changes made to I-73 South and how the overall impacts changed in response to the changes.

I-95/I-73 Interchange Ramp Widening

Initially, the flyover ramps connecting I-95 northbound to I-73 northbound and I-95 southbound to I-73 southbound were proposed to have one 16-foot travel lane. These flyover ramps were changed to two 12-foot travel lanes, which would function as necessary to accommodate future traffic, allow for temporary lane closures of one lane on the flyover ramps, allow the flyover ramps to have a longer service life and eliminate future widening, accommodate emergency services, and improve hurricane evacuation.

S.C. Route 22/I-73 Interchange Ramp Re-design

The original interchange ramp design connecting I-73 South to S.C. Route 22 was a three-level, system-to-system directional interchange, with multiple bridges. To reduce costs, the interchange was changed to a two-lane trumpet design, which would result in a two-level design. The re-design saved $31.1 million by reducing the number of bridges. In addition, it would lessen the impact to Bakers Chapel Road by having a smaller overpass footprint.

Barnhill Road (S-26-309) Overpass Re-alignment

The initial Barnhill Road overpass had a sharp angle, or skew, where it crossed over the I-73 South alignment. Whenever a road crosses over another road at an angle greater than 90°, this is termed as a skewed crossing. The greater the variance from 90°, the heavier the skew, which results in a longer bridge length being needed. The overpass was redesigned to reduce the heavy skew and shorten the overpass bridge, which allowed for pre-stressed concrete girders to be used instead of structural steel superstructures. This reduced the cost of the bridge by $1.1 million, and the pre-stressed concrete girders would result in less maintenance costs over time. In addition, the skew was improved, which would result in more predictable behavior should a seismic event occur.

Elimination of Rest Areas

Originally, a rest area was proposed for the southbound lane of I-73 just south of Zion Road, and the rest area for the northbound lane of I-73 was just south of Harry Martin Road. It was proposed to eliminate these two rest areas, since none were required. This saved approximately $20 million in construction costs, not including the yearly maintenance costs that would be saved. Potential utility right-of-way conflicts would be avoided, and SCDOT would not be liable for the rest areas. Also, the Harry Martin Road bridge overpass was shortened due to this design change.

Derrick Road Re-alignment

The Derrick Road Re-alignment is also referred to as the Watermill Road Shift. The preliminary design re-aligned Derrick Road adjacent to the western side of the mainline to connect to Watermill Road. While preparing right-of-way plans, it was found that the original design did not meet design criteria, so Derrick Road was re-aligned to 450 feet farther west of the mainline to meet design criteria.

Good Luck Road (S-26-569) Re-alignment

The original design of the Good Luck Road overpass involved two curves, on either side of the overpass bridge. To improve the design and driver expectancy on Good Luck Road, the overpass was re-aligned so there would be one curve, which resulted in it being relocated approximately 1,450 feet south of where the original overpass crossed the mainline of I-73 South.

J.H. Martin Road at Joiner Swamp Road (S-26-45) Frontage Road Re-alignment

Originally, the frontage road for J.H. Martin Road at Joiner Swamp Road was located approximately 750 feet east of the centerline of I-73 South. Recently, a new house was constructed in the construction footprint of the frontage road. To avoid relocating the residence, the frontage road was shifted approximately 300 feet east of the original alignment.

Design Change Impacts

Overall the impacts from the design changes had no impacts to communities, environmental justice populations, historic resources, potentially hazardous material sites, noise receptors, or floodplains. The impacts are noted below in Table 5, page 20. No additional relocations were required due to the design changes, with the J.H. Martin Road at Joiner Swamp Road Frontage Road Re-alignment actually avoiding a relocation that was not there previously during the original I-73 impact evaluation. The total impacts to prime, unique, or statewide important farmland soils increased by 9.19 acres, while the total impacts to wetlands and other jurisdictional waters of the United States decreased by 0.26 acre. The impacts to wetlands and other jurisdictional waters of the United States as a result of the design changes were depicted on the pending jurisdictional determination for I-73 South submitted to the USACE on June 17, 2010.

Table 5
Summary of Impacts from I-73 South Re-evaluation Design Changes

Location	Community Impacts	Net Impacts to Protected Farmlands (in acres)	Net Impacts to Wetlands (in acres)	Federally Protected Species	Other Resources
I-95/I-73 Interchange Ramp Widening	None	7.27	+0.34	The proposed design changes would not affect any listed species, which include American chaffseed, Canby's dropwort, pondberry, bald eagle, red-cockaded woodpecker, and shortnose sturgeon.	There would be no impacts anticipated to communities, environmental justice communities, historic resources, potentially hazardous material sites, noise receptors, or floodplains as a result of the proposed design changes.
S.C. Route 22/I-73 Interchange Ramp Re-design	None	-3.06	-7.38		
Barnhill Road (S-26-309) Overpass Re-alignment	None	4.28	+2.66		
Derrick Road Re-alignment	None	3.45	-0.04		
Good Luck Road (S-26-569) Re-alignment	None	-3.45	+2.78		
J.H. Martin Road at Joiner Swamp Road (S-26-45) Frontage Road Re-alignment	Avoided 1 relocation	0.7	+1.38		
Total Acreage Increase/Decrease from Original Design	-	**+9.19**	**-0.26**		

Notes:
"+/-" indicates increase or decrease in impacts as compared to 2008 FEIS Selected Alternative.
Calculation based on right-of-way boundary.

VI. Current Status of I-73 Project

A jurisdictional determination has been issued by the USACE for both I-73 South and North. Due to the small shifts in the alignment of I-73 South from the Value Engineering study and Re-evaluation of the I-73 South FEIS, a request for an additional jurisdictional determination was submitted to the USACE for these design changes. The jurisdictional determination for the changes to I-73 South jurisdictional determination is currently pending.

Based on the final design, a total of 271.9 acres of wetlands and 4,643 linear feet of streams would be permanently filled as a result of the I-73 project. In addition, 17.1 acres of wetlands would be permanently cleared and 4.4 acres of wetlands would be excavated. A total of 48.9 acres of wetlands would be temporarily cleared. This results in a total of 342.3 acres of wetland impacts.

The USACE Charleston District's SOP was used to determine the number of credits needed to mitigate for impacts to wetlands and other jurisdictional waters of the United States. The ACT agreed to calculate credits using the SOP for each 11-digit HUC watershed unit at the April 10, 2007, ACT meeting, which was the method used to derive the amount of credits needed for the I-73 project. To compensate for impacts to wetlands and other jurisdictional waters of the United States, a total of 4,781.13 wetland credits and 18,220.0 stream credits will be needed. To fulfill these credits, the credits remaining in the Sandy Island Mitigation Bank in Georgetown County will first be applied. Two mitigation sites will also be purchased, as detailed in the Conceptual Mitigation Plan. The first site, Joiner Bay, is a landscape scale wetlands restoration project with multiple wetland types matching the various impacted habitats along the I-73 corridor. The site is located two miles from the I-73 Preferred Corridor in western Horry County within the same watershed containing the majority of the wetland impacts. The second site, Brittons Neck, is a coastal plain stream restoration site located in the watershed covering the northern section of the I-73 Preferred Corridor. The integration of these two mitigation projects provides significant ecological benefits by increasing the scale of conservation at one location. Once the Conceptual Mitigation Plan is approved, a final mitigation plan will be prepared for review and approval.

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SC Department of Transportation Attn: Mr. Randy D. Williamson	Post Office Box 191 Columbia, SC 29202	(803) 737-1700

Proposed Project:

Project Title	Nearest Impacted Waterbody (Include stream code if known)
I-73 (SCDOT PIN 36358_RD01)	Crooked Creek, Beverly Creek, Hagins Prong, Cottingham Creek, Little Reedy Creek, Little Pee Dee River, Black Creek, Back Swamp, Lake Swamp, etc. and many unnamed tributaries

Project Address or Location Description		Latitude	Longitude
Proposed I-73 corridor from NC/SC border to S 22 near Conway SC	START	34° 47' 33" N,	79° 39' 37.5" W
	STOP	33° 56' 17" N,	79° 04' 06" W

Agent (if any):

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Adjacent Property Owners (attach additional sheets if necessary)

Name

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I-73 Pipe and Box Culvert Information
NC/SC State Border to I-95

Map ID	Feature	Sheet Number	Size/Type*	Flow In	Flow Out
ML 1	Wetland	12	BC	Unknown	Unknown
ML 8	J. Ditch	15	RCP	Unknown	Unknown
ML 12	Wetland	17	Bridge	Unknown	Unknown
ML 20	J. Ditch	19	BC	Unknown	Unknown
ML 22	J. Ditch	20	BC	Unknown	Unknown
ML 23	Wetland	21	BC	Unknown	Unknown
ML 26	Wetland	23	BC	Unknown	Unknown
ML 30 & 31	Pond/Wetland	25	RCP	Unknown	Unknown
ML 34	Wetland	28	Bridge	Unknown	Unknown
ML 35	J. Ditch	28	RCP	Unknown	Unknown
ML 36 & 37	Wetlands	30	RCP	Unknown	Unknown
ML 38	J. Ditch	31	RCP	Unknown	Unknown
ML 39	Wetland	31	BC	Unknown	Unknown
ML 45	J. Ditch	33/34	RCP/BC	Unknown	Unknown
ML 48	Wetland	35	BC	Unknown	Unknown
ML 53	Wetland	35	BC	Unknown	Unknown
D 54	J. Ditch	35	RCP	Unknown	Unknown
D 60	J. Ditch	41	RCP	Unknown	Unknown
D 61	Wetland	41	Bridge	Unknown	Unknown
D 63	Stream	43/44	BC/Bridge	Unknown	Unknown
D 67	Wetland	43	BC	Unknown	Unknown
D 64	Wetland	44	Bridge	Unknown	Unknown

* Sizes to be determined
J. Ditch = significant nexus
RCP = reinforced concrete pipe
BC = box culvert

PROPOSED I-73 PHASE IIB (NORTH)
Hydraulic and Hydrological Executive Summary

I-73 Phase IIB consists of approximately 35 miles of new interstate. This northern section of the project will tie to Interstate 73/74 in the Rockingham/Hamlet, North Carolina region and run south across the South Carolina/North Carolina state line through Marlboro and Dillon Counties to a connection with Interstate 95.

This study analyzes the effects of constructing I-73 over Beverly Creek, Cottingham Creek, Hagins Prong, Little Reedy Creek, and a tributary of Little Reedy Creek. Of the proposed creek crossings, Cottingham Creek is the only one with base flood elevations (BFEs) published by the Federal Emergency Management Agency (FEMA). Beverly Creek, Hagins Prong, Little Reedy Creek and the tributary to Little Reedy Creek are located in flood zones where no FEMA studies exist, and BFEs have not been established. The majority of the watershed for Beverly Creek, Hagins Prong, Little Reedy Creek, and Little Reedy Creek is rural.

1. Cottingham Creek

The BFEs for the proposed I-73 crossing of Cottingham Creek can be found on Flood Insurance Rate Map 450146 0100 B dated November 6, 1991. The information in the FEMA studies for Cottingham Creek is in the National Geodetic Vertical Datum (NGVD) of 1929. The information was converted to NAVD 1988. The Cottingham Creek floodway is approximately 600 feet wide and the 50-year flood elevation is 136.3 feet. When converted from 1929 to 1988, this elevation is 135.3 feet. This BFE was supplied to the roadway designers to assist with setting the grade for the proposed I-73.

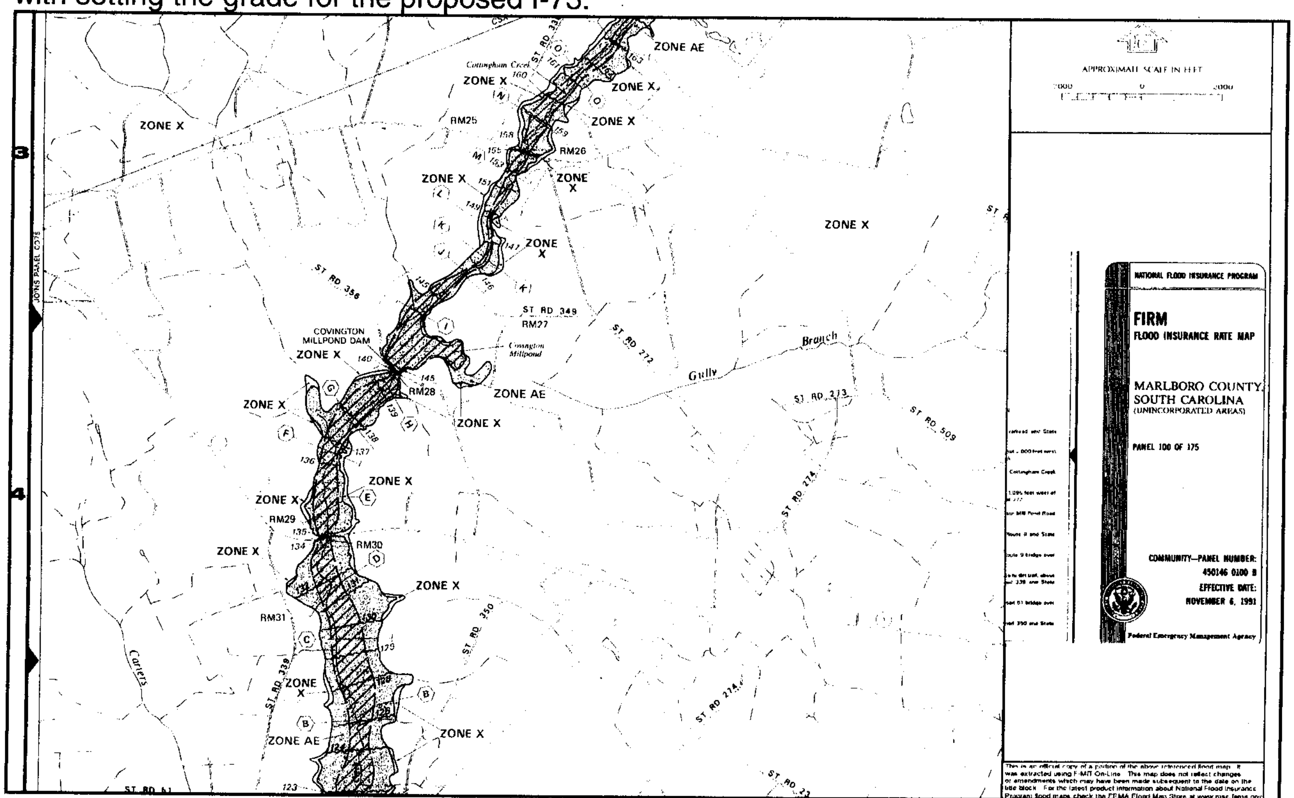


Figure 1. FIRM 450146 0100 B, dated November 6, 1991.

2. Preliminary Hydraulic Analysis

For the proposed crossings where no existing base flood elevations have been established, THE LPA GROUP INCORPORATED performed hydraulic studies to determine the effects of constructing the bridges. The 2, 5, 10, 25, 50, 100, 200, and 500-year discharges were obtained using the method in the USGS National Flood Frequency Program. According to the South Carolina Department of Transportation (SCDOT) Drainage Manual:

"The design for establishing bridge location and bridge geometry for secondary roads is the 25 year discharge. For primary and interstate routes the design discharge is the 50-year discharge."

Hydraulic models were created in HEC-RAS using cross sections cut using ARC GIS software and the USGS quadrangle maps. Sections were checked visually and with aerial mapping to update n-values and verify the accuracy of the section where possible. The hydraulic slope was obtained using USGS Quadrangle maps for the sites. The flow rates determined from the National Flood Frequency Program were entered into the HEC-RAS model and used to perform a preliminary hydraulic study analyzing the water surface elevations for the existing and proposed bridges and culverts.

The hydraulic model for the proposed interstate includes natural, existing, and proposed condition geometries. The natural geometry removes the existing structure and roadway embankment from the crossing to imitate natural conditions prior to construction at the crossing. The existing model geometry includes the existing culverts and/or bridges and ineffective flow areas to model the existing crossing.

2.1 Beverly Creek

Beverly Creek is in Marlboro County, SC, northeast of the town of Bennettsville. The drainage area of 8.01 square miles was delineated from USGS Quadrangle maps. Beverly Creek is on the boundary between the Upper and Lower Coastal Plain, so both conditions were modeled to establish a worse case scenario. The following assumptions were made for the Beverly Creek model:

- The creek depth was measured on site to be approximately 6 ft. A constant channel depth of approximately 6 feet was assumed.
- The creek is assumed to be 25 ft wide.
- The size of the culvert under Hwy 385 was confirmed as a 10' x 10' box culvert. The culvert under Burnt Factory Rd/Marvin Quick Rd was assumed to be the same size.
- The size of the culvert under Beverly Creek Rd was assumed to be the same as what is shown on the old road plans.
- The height of the deck was determined by picking a point on the road profiles and matching it up with the same point on the contour map and then adding that factor to the profile.
- I-73 profile data was based on preliminary design obtained from Wilbur Smith Associates.
- The bridge span was measured as 285.6 ft from end of slab to end of slab. It was assumed that the width of opening is 250 ft.
- The assumed pier spacing is 75'-100'-75' with a 3 ft width.
- A depth of >6 ft for the deck was assumed.

There are multiple culverts included in the model: a double 10' x 10' box culvert under SC 385, a double 10' x 10' box culvert under Burnt Factory Rd/ Marvin Quick Rd, and double 48" RCP under Beverly Creek Rd. The design storm for Burnt Factory Rd/Marvin Quick Rd and Beverly Creek Rd is the 25-year storm per the SCDOT drainage design criteria for a secondary road. The design storm for SC 385 is the 50-year storm per the SCDOT drainage design criteria for a primary road or an interstate.

Using the Upper Coastal Plain flows and based on the preliminary bridge hydraulic studies on the existing culverts, all roads met current SCDOT requirements for conveyance and backwater, except for Beverly Creek Rd. Using the Lower Coastal Plain flows Beverly Creek Rd produces more than 1 foot of back water and does not convey the 25 year storm.

The proposed geometry includes the proposed bridge with a span of 250 feet and an approximate height of 42 feet, with ineffective flow areas to account for the constriction of the roadway embankment.

The risk assessment for this site found no risk because the proposed interstate met criteria for conveyance and backwater using both flows.

2.2 Hagins Prong

Hagins Prong is in Dillon County, SC, northwest of the town of Dunbar. The drainage area of 18.3 square miles was delineated from USGS Quadrangle maps. The site is located in the lower coastal plain. The following assumptions were made for the Hagins Prong model:

- The preliminary profile showed the bridge as 514.45 feet long and approximately 20 feet high. This preliminary data is what was entered into the model.

The Hebron Dunbar Rd bridge has an 80' span and is 8.5' high. The design storm for Hebron Dunbar Rd is the 25-year storm per the SCDOT drainage design criteria for a secondary road. Based on the preliminary bridge hydraulic studies on the existing bridge, all roads met current SCDOT requirements for conveyance and backwater.

The proposed geometry includes the proposed bridge with a span of approximately 515 feet and an approximate height of 13 feet, with ineffective flow areas to account for the constriction of the roadway embankment. Because the bridge is so large, it has almost no effect on the channel. Neither the existing road nor the proposed interstate overtops for any storms.

The risk assessment for this site found no risk because the proposed interstate met criteria for conveyance and backwater.

2.3 Little Reedy Creek

Little Reedy Creek is in Dillon County, SC, southwest of the town of Centerville. The drainage area of 20.37 square miles was delineated from USGS Quadrangle maps. The site is located in the lower coastal plain. The following assumptions were made for the Little Reedy Creek model:

- The Hwy 34 crossing was observed to be a dry creek bed approximately 10 feet wide, and 2 feet deep. This was assumed to be constant down through station 26408.

- At the Centerville Rd crossing the creek was approximately 25 feet wide and 2-3 feet deep. A 70 ft span with 4 piers was approximated utilizing old plans. Three relief culverts were also specified in the plans.
- I-73 data was obtained from the preliminary design. The bridge length was assumed to be 366 ft. Bridge geometry was assumed to consist of 4 piers at 75 ft spacing. The embankment side slopes were assumed to be at a 2:1 slope, and the bridge deck depth was assumed to be slightly greater than 3 ft. Also, the bridge and the piers was modeled at a 35 degree skew.

The data for the bridge at Centerville Road was obtained using old plan sheets that were verified by a site visit. The plans also indicated three relief culverts: double 60" RCPs and one 36" RCP. The existing bridge under Centerville Road spans 75 ft and is approximately 8 feet high. The design storm for Centerville Road is the 25-year storm per the SCDOT drainage design criteria for a secondary road. In the existing model Centerville Road overtopped during the 25 year storm event, but not at the bridge. Based on the preliminary bridge hydraulic studies on the existing bridge, Centerville Road did not meet current SCDOT requirements for conveyance.

The proposed geometry includes the proposed bridge with a span of 366 feet and an approximate height of 22 feet, the bridge and the piers were skewed and ineffective flow areas were added to account for the constriction of the roadway embankment. When the proposed model was put into HEC-RAS and run, none of the storms overtopped the road, and there was more than 1 foot of backwater.

2.4 Tributary to Little Reedy Creek

The tributary to Little Reedy Creek is in Dillon County, SC, southwest of the town of Centerville. The drainage area of 20.37 square miles was delineated from USGS Quadrangle maps. The site is located in the lower coastal plain. The following assumptions were made for the tributary to Little Reedy Creek model:

- The bridge length was assumed to be 193 ft based on preliminary plan design.
- Centerville Rd was removed from the proposed model based on information that it would no longer be used after the construction of I-73.

The existing bridge under Centerville Road spans 75 ft and is approximately 8 feet high. The design storm for Centerville Road is the 25-year storm per the SCDOT drainage design criteria for a secondary road. Based on the preliminary bridge hydraulic studies on the existing bridge, Centerville Road did not meet current SCDOT requirements for conveyance.

The proposed geometry includes the proposed bridge with a span of approximately 190 feet and an approximate height of 25 feet. Because the alignment of the interstate cuts through the middle of a floodplain, four triple 72" relief culverts were added to try to simulate the total area being one watershed. Centerville Rd was also removed.

The risk assessment for this site found that the proposed interstate did not meet criteria for backwater. Because the proposed interstate runs through the middle of a flood plain, a more detailed analysis is needed.

3. Summary

These are preliminary analyses for environmental permitting proposes. They were not based on detailed field surveys and should not be considered final bridge hydraulic studies. The required maps, calculations, computer runs, preliminary bridge layout and other pertinent information are included in the Appendices of this report.

Based on this analysis, the proposed bridges over Beverly Creek and Hagins Prong do meet SCDOT criteria for backwater and freeboard, and convey the design storm event.

The proposed bridges over Little Reedy Creek and the tributary to Little Reedy Creek do not meet SCDOT criteria for backwater when analyzed with a conservative one dimensional model such as HEC RAS. The SCDOT Drainage Manual states, "It is the Department's policy to limit the increase to 1.0 foot above the unrestricted or natural 100-year profile, if practical." In the Little Reedy Creek study, the 100 year water surface elevation in the natural channel is 117.29 ft, and 118.84 ft for the proposed channel. In the tributary to Little Reedy Creek study, the 100 year water surface elevation in the natural channel is 113.40 ft, and 116.42 ft for the proposed channel. It is recommended that a more detailed two-dimensional model be performed for the final bridge hydraulic study.

I-73 Phase IIB					
Bridge	**Estimated Low Chord Elevation (ft)***	**50 Year W.S. @ Upstream Toe of Slope**	**Preliminary Span Estimate**	**Spans OK, or required changes**	**Comments**
1. Beverly Creek	202.0	161.1	250ft	OK	Meets SCDOT criteria for backwater, freeboard and conveyance
2. Cottingham Creek	N/A	N/A	N/A	OK	Road grade based on FEMA study
3. Hagins Prong	128.0	118.3	515ft	OK	Meets SCDOT criteria for backwater, freeboard and conveyance
4. Little Reedy Creek	126.0	117.6	366ft skewed 35 degrees	OK	Meets SCDOT criteria for freeboard and conveyance, but not backwater
5. Little Reedy Creek Tributary	130.0	114.0	190ft	OK	Meets SCDOT criteria for freeboard and conveyance, but not backwater

*** Water surface elevations calculated using HEC RAS model built upon estimated conditions.**

I-73 Pipe and Box Culvert Information
I-95 to SC Route 22

Station	Road	Sheet Number	Map ID	Feature	Feature Name	Type	Size/Type	Invert In	Invert Out	Pre Construction Q (cfs)	Post Construction Q (cfs)	% Difference	Comments
2947+50	I-73	46	N/A	NJ Ditch	Unnamed Tributary	Ephemeral	RCP			40.5	38	-6.2	
684+00	I-95	47	D5	NJ Ditch	Unnamed Tributary	Ephemeral	(4) 8'x10' BC	95.65	95.43				
753+75	I-95	49	D3	J. Ditch	Unnamed Tributary	Intermittent	36" RCP	112.4	112.3				
3055+50	I-73	51	D12	Wetland	N/A	N/A	36" RCP	116.5	115.8	74.6	52.0	-30.3	
3104+00	I-73	55	N/A	NJ Ditch	Unnamed Tributary	Ephemeral	RCP						
3137+50	I-73	57	D22	J. Ditch	UT to Catfish	Intermittent	42" RCP	103.6	102				
3155+75	I-73	57	D22	J. Ditch	UT to Catfish Canal	Intermittent	Dual 36" RCP	112.5	111.7				
3199+00	I-73	60	N/A	NJ Ditch	Unnamed Tributary	Ephemeral	42" RCP						
3205+00	I-73	60	D27	J. Ditch	UT to Catfish	Intermittent	4'x3' BC	100	98.7				
3225+50	I-73	60	N/A	NJ Ditch	Unnamed Tributary	Ephemeral	36" SWP						
3254+00	A2FR5	62	D36	J. Ditch	UT to Catfish	Intermittent	48" RCP	119	112				
3271+00	I-73	62	D38	J. Ditch	UT to Catfish	Intermittent	4'x3' BC	102	97				
3284+75	I-73	65	D40	Wetland/J. Ditch	UT to Catfish Canal	Intermittent to Perennial	Dual 6'x4' BC	91	89				
3298+00	Frontage Rd 5	65	N/A	NJ Ditch	Unnamed Tributary	Ephemeral	RCP						
3308+50	501 Ramp 4	67	D44	Wetland	N/A	N/A	RCP						
3316+00	Frontage Rd 5	67	D45	Wetland	N/A	N/A	RCP						
3319+00	I-73	67	D 48/49	Stream	Unnamed Tributary	Perennial	6'x4' BC	90.5	90				

I-73 Pipe and Box Culvert Information
I-95 to SC Route 22

Station	Road	Sheet Number	Map ID	Feature	Feature Name	Type	Size/Type	Invert In	Invert Out	Pre Construction Q (cfs)	Post Construction Q (cfs)	% Difference	Comments
3352+50	I-73	70	N/A	NJ Ditch	Unnamed Tributary	Ephemeral	RCP						
142+00	S-197	72	N/A	NJ Ditch	Unnamed Tributary	Ephemeral	RCP						
3383+00	I-73	72	M2	Stream	Unnamed Tributary	Intermittent	60" RCP	99.2	98.5				
3469+00	I-73	74	M6	NJ Ditch	Unnamed Tributary	Ephemeral	RCP						
3488+00	I-73	74	M10	Stream	Unnamed Tributary	Intermittent	RCP						
3489+00	I-73	74	M11	Wetland	N/A	N/A	42" RCP	98.52	97.78				
3490+75	S-56	77	M13	Ag. Pond	N/A	N/A	RCP						
3578+00	I-73	79	M23/M24	Wetland	N/A	N/A	48" RCP	93.9	93.1				
3578+25	I-73	79	N/A	NJ Ditch	Unnamed Tributary	Ephemeral	RCP						
3590+25	I-73	79	N/A	NJ Ditch	Unnamed Tributary	Ephemeral	RCP						
3615+50	SC 242	81	N/A	NJ Ditch	Unnamed Tributary	Ephemeral	RCP						
3654+00	I-73	83	N/A	NJ Ditch	Unnamed Tributary	Ephemeral	RCP						
3664+53	I-73	83	M32	J. Ditch	Unnamed Tributary	Ephemeral	Dual 54" RCP	92.5	92	135	141	4.4	
3679+00	I-73	83	N/A	NJ Ditch	Unnamed Tributary	Ephemeral	Dual RCP						
3664+53	I-73	83	M36	NJ Ditch	N/A	N/A							
3727+00	I-73	85	N/A	NJ Ditch	Unnamed Tributary	Ephemeral	Dual RCP						
3744+00	I-73	85	N/A	NJ Ditch	Unnamed Tributary	Ephemeral	RCP						
3808+62	I-73	87	N/A	NJ Ditch	Unnamed Tributary	Ephemeral	RCP			172.2	177.8	3.3	
3816+00	I-73	87	M42	J. Ditch	Unnamed Tributary	Ephemeral to Intermittent	Dual 66" RCP	108.5	108				
3835+76	I-73	89	N/A	NJ Ditch	Unnamed Tributary	Ephemeral	RCP						

Station	Road	Sheet Number	Map ID	Feature	Feature Name	Type	Size/Type	Invert In	Invert Out	Pre Construction Q (cfs)	Post Construction Q (cfs)	% Difference	Comments
3845+00	I-73	89	N/A	NJ Ditch	Unnamed Tributary	Ephemeral	RCP						
90+75	Harry Martin Rd	89	M 45/47	Stream	Unnamed Tributary	Intermittent	Triple 42" RCP	97.5	97	134	134	0	
3853+00	I-73	89	N/A	NJ Ditch	Unnamed Tributary	Ephemeral	RCP						
3880+53	I-73	91	M52	Stream	Unnamed Tributary	Perennial	Triple 60" RCP (recessed)	86.6	86.3	155	155	0.0	
3883+00	I-73	91	N/A	NJ Ditch	Unnamed Tributary	Ephemeral	RCP			1.3	3.1	138.5	
31+85	S-668	91	N/A	NJ Ditch	Unnamed Tributary	Ephemeral	RCP						
45+60		93	M53	Wetland	Unnamed Tributary	Perennial							
3905+00	I-73	95	N/A	NJ Ditch	Unnamed Tributary	Ephemeral	RCP			60.0	63.9	6.5	
3934+50	I-73	97	M60	J. Ditch	Unnamed Tributary	Ephemeral	RCP			19.2	24.6	28.1	
4023+50	I-73	103	M68	J. Ditch	Unnamed Tributary	Intermittent	RCP						
4039+50	I-73	103	N/A	NJ Ditch	Unnamed Tributary	Ephemeral	RCP						
4061+25	I-73	105	N/A	NJ Ditch	Unnamed Tributary	Ephemeral	RCP			23.6	27.6	16.9	
4071+75	I-73	105	M71	J. Ditch	Unnamed Tributary	Intermittent	42" RCP	92.65	92	8.1	18.9	133.3	
4087+50	I-73	106	N/A	NJ Ditch	Unnamed Tributary	Ephemeral	RCP			45.1	61.2	35.7	
4101+60	I-73	106	M74	Wetland/NJ Ditch	Unnamed Tributary	Ephemeral	RCP						
4101+00	I-73	106	N/A	NJ Ditch	Unnamed Tributary	Ephemeral	RCP						
4112+00	I-73	106	N/A	NJ Ditch	Unnamed Tributary	Ephemeral	RCP			16.0	18.5	15.6	
4192+00	I-73	108	M78	Wetland	N/A	N/A	18" RCP	85	84.7				
4205+50	I-73	110	M79	Wetland	N/A	N/A	36" RCP	42.5	42				

I-73 Pipe and Box Culvert Information
I-95 to SC Route 22

Station	Road	Sheet Number	Map ID	Feature	Feature Name	Type	Size/Type	Invert In	Invert Out	Pre Construction Q (cfs)	Post Construction Q (cfs)	% Difference	Comments
4209+00	I-73	110	M79	Wetland	N/A	N/A	36" RCP	42.5	42.5	52.9	56.2	6.2	
4224+50	I-73	110	M81	Wetland	N/A	N/A	Dual 24" RCP	44.25	44.25	8.3	8.2	-1.2	
4232+00	I-73	110	M82	Wetland	N/A	N/A	RCP			13.9	9.1	-34.5	
4241+00	I-73	113	M84	Wetland	N/A	N/A	RCP						
4244+00	I-73	113	M84	Wetland	N/A	N/A	RCP						
4263+00	I-73	113	M85	Wetland	N/A	N/A	RCP						
4269+75	I-73	115	M86	Wetland	N/A	N/A	RCP			10.4	14.3	37.5	
4295+00	I-73	117	H1	Wetland	N/A	N/A	RCP						
4297+50	I-73	117	H1	Wetland	N/A	N/A	RCP						
4317+00	I-73	117	H10	Wetland	N/A	N/A	RCP						
4394+25	I-73	124	H18	Wetland	N/A	N/A	Dual 24" RCP	55.4	54.7				
4403+00	I-73	124	H18	Wetland	N/A	N/A	RCP						
4429+00	I-73	126	H20	Wetland	N/A	N/A	4'x2' BC	56.8	56.1	42.2	44.1	4.5	
4441+00	I-73	126	H23	J. Ditch	Unnamed Tributary	Intermittent	RCP						
4451+00	I-73	128	H25	Wetland	N/A	N/A	BC						
90+00	S-23	131	N/A	NJ Ditch	Unnamed Tributary	Ephemeral	RCP			1.5	1.6	5.0	
97+30	S-23	131	N/A	NJ Ditch	Unnamed Tributary	Ephemeral	RCP			20.5	21.3	3.7	
4500+00	I-73	131	H30	Wetland	N/A	N/A	36" RCP	65.9	65.6	18.7	20.0	6.6	
97+25	S-99	133	N/A	NJ Ditch	Unnamed Tributary	Ephemeral	RCP						
106+50	S-99	133	N/A	NJ Ditch	Unnamed Tributary	Ephemeral	RCP						
		133	H35	Stream	Unnamed Tributary	Intermittent	BC						Pipe is not required for hydraulic design
		133	H36	J. Ditch	Unnamed Tributary	Intermittent	RCP						Pipe is not required for hydraulic design
4551+00	I-73	136	H37	Wetland	N/A	N/A	30" RCP	49	47	26.6	22.4	-15.9	
4628+30	I-73	140	H41	Wetland	Rattlesnake Branch	Intermittent	36" RCP	56.43	56.33	46.4	45.5	-1.8	
4636+00	Ramp A	140	N/A	NJ Ditch	Unnamed Tributary	Ephemeral	RCP			11.1	13.6	22.5	

Station	Road	Sheet Number	Map ID	Feature	Feature Name	Type	Size/Type	Invert In	Invert Out	Pre Construction Q (cfs)	Post Construction Q (cfs)	% Difference	Comments
4650+00	I-73	142	H43	Stream	Long Branch	Perennial	8'x5' BC	53	52.35	134.3	134.3	0.0	
4682+20	I-73	147	N/A	NJ Ditch	Unnamed Tributary	Ephemeral	RCP			166.8	116.3	-30.3	
		147	H49	Wetland/J. Ditch	N/A	N/A	RCP						Pipe is not required for hydraulic design
4727+15	I-73	150	H50	Stream	Unnamed Tributary	Intermittent	8'x5' BC	77.5	77.1	128.0	128.0	0.0	
106+00	SC 309	150	H51	Wetland	N/A	N/A	42" RCP	79.5	79.3				
4759+00	I-73	152	H55	Wetland	N/A	N/A	42" RCP	89	88.6	31.6	32.7	3.4	
4773+20	I-73	152	H59	Stream	Unnamed Tributary	Intermittent	7'x4' BC	81	80	99.2	102.8	3.6	
4818+00	Frontage Rd	155	H63	Wetland	N/A	N/A	18" RCP	75.46	75.2				
4826+00	Frontage Rd	157	H67	J. Ditch	Unnamed Tributary	Intermittent	RCP						
120+00	S-569	159	H79	Wetland	N/A	N/A	RCP						
4899+32	I-73	161	H79	Wetland	N/A	N/A	8'x5' BC	103	102.6	159.5	159.5	0.0	
4928+82	I-73	163	H81	Stream			8'x5' BC	95.7	95.2	132.8	132.8	0.0	
4947+83	I-73	163	N/A	NJ Ditch	Unnamed Tributary	Ephemeral	RCP			17.4	18.8	8.0	
4993+56	I-73	166	H88	Stream	Unnamed Tributary	Intermittent	30" RCP	99.3	98	13.6	17.2	26.5	
5011+28	I-73	166	H90	Wetland	N/A	N/A	60" RCP	95.8	95.3	82	82	0.0	
107+50	S-75	166	N/A	NJ Ditch	Unnamed Tributary	Ephemeral	RCP						
5060+00	I-73	168	N/A	NJ Ditch	Unnamed Tributary	Ephemeral	BC			192.5	192.5	0	
5092+00	I-73	170	H98	Wetland	N/A	N/A	Dual 7'x5' BC	91	90.6	200.3	206.3	3.0	
5148+20	I-73	172	H105	Stream	Unnamed Tributary	Perennial	7'x5' BC	70	69.5	110.9	110.9	0.0	
5135+00	I-73	172	H101	Wetland/J. Ditch	N/A	N/A	RCP			3.6	4.6	27.8	
109+00	S-97	174	N/A	NJ Ditch	Unnamed Tributary	Ephemeral	RCP						

I-73 Pipe and Box Culvert Information
I-95 to SC Route 22

Station	Road	Sheet Number	Map ID	Feature	Feature Name	Type	Size/Type	Invert In	Invert Out	Pre Construction Q (cfs)	Post Construction Q (cfs)	% Difference	Comments
5184+50	I-73	174	H110	J. Ditch	Unnamed Tributary	Ephemeral	36" RCP	85.15	84.77				
5193+50	I-73	176	H111	J. Ditch	Cross Branch	Intermittent	48" RCP	82.1	81.34				
5208+00	I-73	176	H118	J. Ditch	Unnamed Tributary to	Intermittent	48" RCP	82.1	81.34				
438+00	SC-22	176	N/A	NJ Ditches	Unnamed Tributaries	Ephemeral	RCP						
119+50	C2_RP_01B	178	H20	Wetland	N/A	N/A	RCP						
5218+50	I-73	178	N/A	NJ Ditch	Unnamed Tributary	Ephemeral	RCP						

NJ Ditch = Non-jurisdictional ditch (no significant nexus)
J. Ditch = Jurisdictional ditch (significant nexus)
RCP = reinforced concrete pipe
BC = box culvert

PROPOSED I-73 PHASE IIA (SOUTH)
Hydraulic and Hydrological Executive Summary

1. Introduction

This project involves building a controlled access roadway to connect I-95 and SC Route 22. All total the project is 43.2 miles in length split into seven segments. The project includes 6 interchanges, 29 crossover roads, 3 CSX railroad crossings, 72 bridges, as well as frontage and side roads. The land use for the project is primarily agricultural.

2. Site Visits

In-depth field visits were performed by the hydraulic design team throughout the course of the project. The purpose of these visits was to inventory existing drainage and patterns and to verify boundaries of watersheds draining through the project.

3. Hydrology

The calculations are for all aspects of the drainage design required to set Right of Way. The Rainfall intensity values were taken from the "Florence" and the "Myrtle Beach" areas of the Rainfall Intensity Values table utilized by the South Carolina Department of Transportation. The 50-year storm was used for design on all crossline pipes and the 100-year storm used as a check. The Rational Method was used on areas ranging from 1 acre-100 acres. The SCS method was used on all areas ranging from 100 acres-0.6 square miles. The USGS method was used to calculate drainages areas larger than 0.6 square miles

4. Stormwater Management

The storm water management design of this project, including the sediment and erosion control design, complies with the South Carolina Department of Transportation Requirements for Hydraulic Design Studies dated 5-15-2000.

5. Roadside Ditches

Calculations for the roadside ditches are included in this notebook. Channel stability was checked using the HEC-15 methodology for Vegetative Class "C".

6. INLET SPACING

Inlets were placed in the median ditch as needed

7. Pre-Post Construction Runoff

The terrain is very flat in this section of the project – generally less than 0.25 feet per 100 feet (0.25%). This gradient also applies to the longitudinal slope of the side ditches. This will result in the flow depth being greater in the ditches. Thus the ditch storage volume will be more fully utilized, causing attenuation of the hydrograph peak, and post-construction detention.

All of the outfalls on this segment have large, flat, offsite contributing watersheds. Due to the flat gradient, the time of concentration (T_c) calculations resulted in a very high T_c for the offsite areas. Even though the roadside ditches are also on minimal grades, the roadway hydrograph peak reaches the outfall ditch prior to the overland flow hydrograph peak reaching the outfall ditch. Therefore the peaks miss, and post-construction runoff is not adversely affected.

In order to demonstrate the situation described above, this section contains the pre-construction vs post-construction calculations for representative outfalls.

1.3 Mitigation Plan Overview

The proposed Conceptual Mitigation Plan includes two sites which, when combined with the remaining preservation credits from Sandy Island, address the I-73 mitigation needs. The first site is a landscape scale wetlands enhancement project with multiple wetland types matching the various impacted habitats by the I-73 corridor. This site is located two miles from the I-73 Preferred Corridor in western Horry County within the same watershed containing the majority of the wetland impacts. The second site is a coastal plain stream restoration site located in the watershed covering the northern section of the I-73 Preferred Corridor.

Mitigation Summary

Location	Wetlands Preservation credits	Wetlands Restoration credits	Wetland Mitigation Credits	Stream Buffer Credits	Stream Restoration Credits	Stream Mitigation Credits
Sandy Island Mitigation Bank	1,500					
Joiner Swamp Wetland Site		2,663				
Brittons Neck Stream Site				2,780	15,440	
Totals			4,163			18,220
Restoration Ratio			64%			85%
HUC	03040206	03040204		03040201	03040201	

An approximation of the location of project impacts and corresponding mitigation is defined below:

Impact by HUC:		Mitigation Location
3040204	81%	Location of 962 acre wetland mitigation site
3040201	11%	Location of 32 acre stream mitigation site
3040206	7%	Location of Sandy island Bank wetland preservation site

The combination of the restoration occurring on the two sites, separate from the 1,500 wetland preservation from Sandy Island Mitigation Bank, matches up well with the acreage of wetland impacts of the I-73 project:

	Impact (Acreage)	**Joiner Bay Site**	**Brittons Neck Site**
Pine Wet Flatwood	114.9	502.4	
Bottomland Hardwood	94.2	166.7	*
Wooded Swamp	64.5		*
Bay Forest	41.9	107.8	
Other	23.0		
Buffers		185.1	31.8
	338.4	**815.3**	**31.8**

* The stream buffer area would become either wooded swamp or bottomland hardwood after stream restoration due to re-connection of stream channel with floodplain

Site A: Joiner Bay Wetland Site

Proposed wetland restoration of the Joiner Bay Wetland Mitigation Site will include approximately 776.9 acres of wetlands and restore a mosaic of wetland plant communities, now considered rare in the vicinity. Wetland credit calculations using the United States Army Corps of Engineers "Standard Operating Procedure" (RD-SOP-02-01) was used to calculate available site credits. Based on these calculations the project is estimated to yield approximately 2,663 wetland credits, with a reserve of 177.9 credits to cover temporary road construction mitigation needs and other variances . A summary of the proposed amount of wetland credits is presented in the table below.

Mitigation Credit Estimation		
Wetland Credit Types	**Credits**	**Acres**
Pine Wet Flatwoods	1826.9	502.4
Bottomland Hardwoods	574.8	166.7
Bay Forest	379.2	107.8
Enhancement by Buffering	0.0	185.1
Preservation	0.0	0.0
Credit reservation	(177.9)	0.0
Total	**2,663.0**	**962.0**

Site B: Brittons Neck Site

The Brittons Neck Stream Mitigation Site has opportunities for coastal plain stream restoration, stream buffer preservation, wetlands preservation and wetlands restoration. The Conceptual Mitigation Plan proposes a mix of coastal stream restoration, stream buffer restoration, and buffer preservation to address the stream mitigation needs of I-73.

The Brittons Neck Site will be structured as a stand alone project but will eventually be integrated with additional stream restoration activities planned upstream. The combination of the two projects would create a much larger scale project and thus provide additional conservation benefits above and beyond those of each individual project. A summary of the proposed amount of stream credits is presented in the table below.

Mitigation Credit Estimation			
Stream Credit Types	**Credits**	**L.F.**	**Acres****
Coastal Stream restoration	15,509	4,249	
Stream buffer restoration	1,788	1,100	
Stream buffer preservation	992	794	
Credit reservation	(69)		
Net Total*	**18,220**	**6,143**	**31.8**

*The proposed stream mitigation site is designed to offset the impacts to 1,496 linear feet of perennial stream and 3,147 linear feet of intermittent stream.

**Portions of the stream buffers would become wooded swamp due to re-connection of stream channel with floodplain

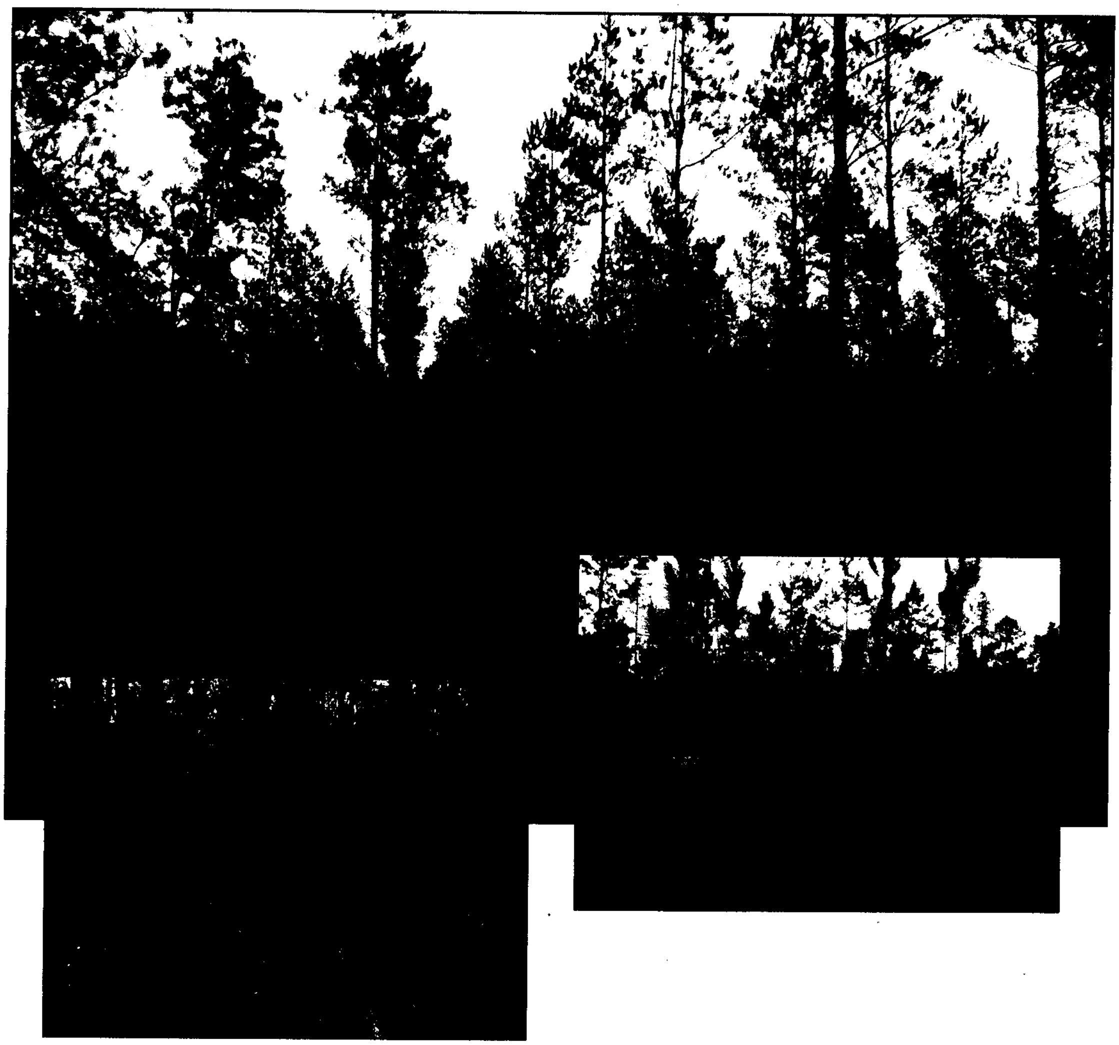
1.4 Implementation Structure

The mitigation will be structured as a permittee-responsible project. It is envisioned that the work will be performed by Environmental Banc & Exchange, LLC, in conjunction with LPA and associated consultants.

Environmental Banc & Exchange, LLC (EBX), founded in 1997, has completed over 45 client specific mitigation and banking projects throughout the Southeast, restored over 41 miles of stream, restored and preserved over 6,000 wetland acres, and rehabilitated numerous other critical habitats. The firm's experience includes the creation, development and participation in the following ecosystem markets: wetlands, stream, endangered species habitat, and water quality. EBX works with private and public sector clients to provide turnkey solutions that offset impacts to ecosystems resulting from expansion of facilities, new development and infrastructure build-out. This project will be managed out of EBX's Camden, SC office. Qualifications and references are located in Section 4.0.

SECTION 2: WETLANDS CONCEPTUAL MITIGATION PLAN

Joiner Bay Wetland Mitigation Site
Horry County, South Carolina



MITIGATION PLAN OVERVIEW

This technical proposal describes the proposed ecosystem restoration approach designed specifically to fulfill a portion of the SCDOT mitigation obligations for the proposed Interstate 73 (I-73), which requires 4,163 wetland credits and 18,220 stream credits.

The overall Conceptual Mitigation Plan for the I-73 project includes two sites which, when combined with the remaining preservation credits from Sandy Island, fulfill the I-73 mitigation needs. The first site is a landscape scale wetlands enhancement project with multiple wetland types matching the various impacted habitats by the I-73 corridor. This site is located two miles from the I-73 Preferred Corridor in West Horry County within the same watershed containing the majority of the wetland impacts. The second site is a coastal plain stream restoration site located in the watershed covering the northern section of the I-73 Preferred Corridor.

Mitigation Summary

Mitigation Location	Wetland Preservation Credits	Wetland Restoration Credits	Total Wetland Mitigation Credits	Stream Buffer Credits	Stream Restoration Credits	Total Stream Mitigation Credits
Sandy Island Mitigation Bank	1,500					
Joiner Bay Wetland Site		2,663				
Brittons Neck Stream Site				3,127	15,093	
Totals			**4,163**			**18,220**
Restoration Ratio			64%			83%
HUC	03040206	03040204		03040201	03040201	

- The Conceptual Mitigation Plan for the Joiner Bay Site follows this Summary
- For details on the Brittons Neck Site, see Section 3.0.
- See the Sandy Island Mitigation Bank Instrument for details

2.1: OBJECTIVES OF THE PROJECT

2.1.1 Project Contacts

Environmental Banc & Exchange, LLC
Randy Wilgis, President
604 Greene St.
Camden, SC 29020
803-432-4890

2.1.2 Wetland Restoration Credits

This Conceptual Mitigation Plan describes the proposed ecosystem restoration approach for the Joiner Bay Mitigation Site and is designed specifically to assist in fulfilling the SCDOT wetland restoration goals for the proposed I-73 project.

Proposed wetland restoration of the Site will include approximately 776.9 acres of wetlands and restore a mosaic of wetland plant communities, now considered rare in the vicinity. Plant community restoration will attempt to approximate wetland vegetation community impacts as described in the Interstate 73: I-95 to the Myrtle Beach Region, Final Environmental Impact Statement (FEIS) [SCDOT, 2005]. The United States Army Corps of Engineers' (USACE) "Standard Operating Procedure" (RD-SOP-02-01) was used to calculate available site wetland credits. Based on these calculations the Site is estimated to yield approximately 2,663 wetland credits. A summary of the proposed amount of wetland credits is present in the table below. A mitigation summary worksheet outlining the scores is provided in Appendix A.

Mitigation Credit Estimation		
Wetland Credit Types	**Credits**	**Acres**
Pine Wet Flatwoods	1826.9	502.4
Bottomland Hardwoods	574.8	166.7
Bay Forest	379.2	107.8
Enhancement by Buffering	0.0	185.1
Preservation	0.0	0.0
Credit reservation	(177.9)	0.0
Total	**2,663.0**	**962.0**

2.1.3 Project Goals

The Site will provide numerous water quality, hydrologic, ecological, and human derived benefits within the Pee-Dee River Basin. While some of the benefits may be limited to the project site or immediate vicinity, many benefits such as improved water quality, water storage, re-establishment of historic water flow to downstream areas, and ecological habitat improvements, will have far-reaching effects throughout the region. Expected site benefits and improvements are outlined below as project goals.

Benefits Related to Water Quality	
Nutrient dilution	Benefit will be achieved through the contribution of clean, nutrient poor water through sheet flow to locations downstream, effectively diluting potential pollutants from downstream sources in numerous tributaries of Lake Swamp and Playcard Swamp.
Groundwater quality	Benefit will be achieved through the increased contribution of clean, nutrient poor water slowly released to adjacent groundwater aquifers and streams, including Loosing Swamp, a 303d listed water body.
Sediment reduction	Benefits will be achieved through the removal of ditches that currently capture on-site sediment and channelize surface water run-off from an 962-acre site and directly discharge into the headwater of Loosing Swamp, a 303d listed water body. Action will also slow downstream volumes and velocities, thereby reducing the opportunity for bank erosion in Loosing Swamp.
Benefits Related to Hydrology	
Surface storage and retention	Benefits will be achieved through increased retention times.
Subsurface water and retention	Benefits will be achieved by increasing the volume of water available to local aquifers through the increased residence time of local rainfall.
Reestablish antecedent drainage patterns	Benefits will be achieved through the re-establishment of antecedent flow patterns within the site, as well as to numerous streams fed by the Joiner Bay system which drain into Playcard Swamp and Lake Swamp, a high priority conservation area.
Benefits Related to Ecological Processes	
Restoration of terrestrial habitat	Benefits will be achieved through the restoration of physical structure and vegetation composition to adjacent buffer areas, through a long-term forest and fire management plan.
Restoration of aquatic habitat	Benefits will be achieved through the restoration of drainage pathways and antecedent hydrologic regime to both on-site and downstream watershed locations.
Long Term restoration of habitat for Federal and state-listed species	Benefits will be achieved by restoring a habitat, through prescribed burning, for numerous elements of concern including wire-leaf dropseed, pine-barrrens reed-grass, short-leaved yellow-eyed grass, Carolina grass-of-parnassus, Savannah milkweed, as well as the red-cockaded woodpecker (inhabited the Site until 2004).

Recreational, Educational, and Aesthetic Benefits	
Recreational and Educational benefits	Benefits will be realized through increased hunting, birding, hiking, and botanizing opportunities.
Open space	Benefits will be derived from preserving approximately 962 acres of open space in a region with little remaining natural vegetation and significant future development pressure due to the proximity to the I-73 corridor.
Improved aesthetics	Benefits will be derived from replacing loblolly pine plantation, with a fire-managed, wet pine flat/headwater pocosin mosaic.
Equivalency to Mitigation Bank Standards	
Watershed approach	The scale of the project, location of the site, the opportunity to restore several rare ecosystems, the likelihood of ecological success, and the hydrologic benefits to the watershed support the restoration of this outstanding resource.
Planning	Rigorous scientific and technical analysis will be performed to support the approved Final Mitigation Plan.
Monitoring Requirements	The project will be subject to a five year monitoring period, with defined ecological performance monitoring benchmarks equivalent to that required of a mitigation bank.
Financial Assurances	The combination of an upfront escrow fund to cover work activities with a long term endowment to fund ongoing land management practices equivalent to that required of a mitigation bank.

2.2: QUALIFICATIONS

See Qualifications in Section 4.0

2.3: TECHNICAL FEASIBILTY OF THE PROJECT SITE

2.3.1 Watershed Description

The Joiner Bay Site is located northwest of the community of Bayboro in Horry County, South Carolina, approximately 13 miles north of Conway (Figure 1, Appendix C). The Site is located in the Coastal Plain physiographic province of South Carolina within the United States Geological Survey (USGS) Hydrologic Cataloguing Unit (HUC) 03040204 of the Pee Dee River Basin (Figure 2, Appendix C). The Site is located within the Carolina Flatwoods ecoregion of South Carolina (Griffith et al. 2002). In comparison to the Atlantic Southern Loam Plains to the west, this ecoregion is characterized by less relief, wider upland surfaces, and larger areas of poorly drained soils. Streams occurring within the Carolina Flatwoods ecoregion are typically low-gradient (that is, slopes less than 1 percent) with sandy and silty substrates. This region was covered by shallow coastal waters during the Pleistocene Age, and the resulting terraces are typically covered by fine-loamy and course-loamy soils, with periodically high water tables. Carolina bays and pocosins are abundant in some areas. Local elevations range from 25 feet National Geodetic Vertical Datum (NGVD) within the floodplain of the nearby Playcard Swamp to 35 feet NGVD within the Site (USGS Bayboro, South Carolina 7.5-minute topographic quadrangle) (Figure 3, Appendix C).

Land-uses in the watershed is dominated by rural uses, including managed forests, large scale agriculture, pastureland, roadside shoulders, and residential lots, and paved and unpaved state roads with limited commercial development occurring in the vicinity of townships and communities. Row crops are actively cultivated immediately southeast of the Site and surrounding areas. Bayboro Park, a county park is located immediately south of the Site, along Joyner Swamp Road.

2.3.2 Site Selection Rationale

The Site is located in HUC 03040204 and is less than 2 miles from the proposed I-73 corridor. Restoration of Joiner Bay and its immediate surrounds present an ideal opportunity to pursue landscape-scale, ecologically meaningful, wetland mitigation. The Site encompasses a large tract of contiguous acreage on the interstream divide and headwater contributor to no less than 5 tributaries of Lake Swamp, a coveted riparian treasure, located less than 3 miles north of the Site. The Site offers the opportunity to restore a rare and diverse assemblage of plant communities including bay forest, headwater riparian communities, and pine wet flatwoods that closely approximates the impacted wetland types. The Site mitigation plan is enhancement based and offers a high probability for success. Headwater streams, bay forest communities, upland buffers, water quality, and wildlife habitat would concurrently improve through the development of the Site. In the long-term, the Site would provide longleaf pine nesting and foraging habitat to the Federally-listed Red-cockaded woodpecker (*Picoides borealis*).

The Site characteristics also match up well to address the impacts of I-73. The mitigation plan includes restoration of the same types of wetland ecosystems as are being impacted by the project and in a comparable ratio (as a percent of total size) when compared with the mix of impact types being addressed by the USACE permit for I-73.

2.4: SITE OWNERSHIP, FINANCIAL ASSURANCE AND LONG-TERM MANAGEMENT

2.4.1 Long-Term Management

To ensure long-term protection of the mitigation project, the entire Site will be placed under a conservation easement in perpetuity as the first primary task following approval of the Final Mitigation Plan. The easement shall be equivalent to the conservation easement template provided on the Charleston District's website. The conservation easement will specify permissible activities such as hunting and other recreational uses under the restriction that the activity causes no negative effect on the functions and values of the restored wetlands. The conservation easement will also allow for ongoing forest management within the mitigation site given that such an activity is performed to maintain or improve the overall ecological function of the site. The easement will be held by a 501(c)3 organization. Both The Pee Dee Land Trust and The Nature Conservancy have expressed an interest holding the easement, pending further review and respective internal approval processes. The Nature Conservancy has also expressed a willingness to consider being the long-term land manager responsible for implementing the long-term management needs.

2.4.2 Long-Term Management Needs

The Site will benefit from continuing forest management following the 5-year monitoring program for the Site. Either the owner of the Site, the easement holder, or a long-term manager will continue to implement the forest management plan that will be developed as part of the Final Mitigation Plan. These activities will be funded by the creation of a long-term endowment sufficient to cover the cost to perform annual prescribed burns in order to maintain the desired plant communities and ecological niches unique to these systems. The entities involved in long-term management, and their respective roles, will be defined as part of the Final Mitigation Plan. The obligation under the Final Mitigation Plan to address Long-Term Management will be the placement of the conservation easement on the Site with an easement holder acceptable to the USACE, funding of the Long Term Endowment, and identification and acceptance of the Long-Term Land Manager.

2.4.3 Ownership

The Site is currently under the control of EBX through a fee simple purchase contract agreement. It is the intent of SCDOT to take fee simple ownership of the Site and encumber the Site under a conservation easement. EBX would perform all required work under Final Mitigation Plan. Once the restoration activities have met the performance criteria, SCDOT may, at its option, transfer the fee simple title underlying the easement to either a state agency, county agency, or a 501(c)3 conservation organization for use as a ecological showcase site for pine savannas or some form of public use compatible with the restrictions and reserved rights of the conservation easement.

2.4.4 Financial Assurances

To meet the equivalency requirement under the 2008 Federal Compensatory Mitigation Regulations, the Conceptual Mitigation Plan incorporates both Short-Term and Long-Term Financial Assurances, as defined below;

a. <u>Short-Term Financial Assurance:</u> A performance bond will be provided that covers the construction phase of implementation of the mitigation project at the Site; and

b. <u>Long-Term Endowment:</u> A Long-Term Endowment will be established to cover easement monitoring, property management, enforcement and forestry management practices specified in the Final Mitigation Plan and described in Section 2.4.2.

2.5: ECOLOGICAL SUITABILITY

2.5.1 Site Description

The Site comprises approximately 962.0 acres situated on an inter-stream flat that historically provided hydrology to Playcard Swamp to the east and numerous feeder tributaries of Lake Swamp to the north and northwest, and Loosing Swamp to the south (Figure 3, Appendix C). An access road currently bisects the Site and is reachable from the north via Watts Road and from the south via Joyner Swamp Road (Figure 1 and 3, Appendix C). Watts Road and Joyner Swamp Road form portions of the northern and southern Site boundaries, respectively. A power line easement runs north-south along the western site boundary and clips the southwestern-most corner of the Site.

The Site supports what was under antecedent conditions a mosaic of fire-dependent, palustrine and terrestrial plant communities (Nelson 1986) including Pine Savanna, Pine Flatwoods, Streamhead Pocosin, and Bay Forest (Figure 4A, Appendix C). In the early 1980s a drainage network was installed through the interior of the Site to facilitate silvicultural operations (Figure 4B, Appendix B). All surface flows and significant amounts of groundwater, that under antecedent conditions flowed toward the eastern and western Site boundaries (Figure 5, Appendix C) was redirected inward along numerous lateral ditches and into two central ditches, where it was redirected south into Loosing Swamp (Figure 6, Appendix C). By the mid 1990s most of the Site had been timbered and was planted with loblolly pine (*Pinus taeda*) [Figure 4C, Appendix C]. The Site and surrounding area contains numerous low lying, oval signatures similar to Carolina Bays, a prominent geomorphic feature found primarily in the Coastal Plain physiographic province.

The Site is actively managed for timber with stands composed exclusively of loblolly pine and, to a lesser extent, a mix of pine and hardwood species. Fire has been excluded from the Site for many decades. Timber stands within the Site are of varying ages ranging from those planted in 1973, to the most recent planting in 2005 (Figure 4D-4E, Appendix C).

2.5.2 Soils

Spatial and tabular Soil Survey Geographic (SSURGO) soil information was retrieved from NRCS (NRCS 2010) and are depicted on Figure 7 (Appendix B). Several distinct features occur within the site boundaries: headwater drainages, wet flat interstream divides, and low rise uplands.

Hydric soils include Johnston loam, Osier loamy sand, Pocomoke fine sandy loam and Woodington fine sandy loam. Nansemond loamy fine sand is partially hydric. On-site hydric soil boundaries are depicted in Figure 7 (Appendix C). Anthropogenic activities including the ditching network and bedding from silvicultural practices has resulted in disturbances and some alterations to hydric soils identified on the Site.

2.5.3 Jurisdictional Wetlands

Wetlands are defined by the presence of three criteria: hydrophytic vegetation, hydric soils, and evidence of wetland hydrology during the growing season (USAC 1987). Portions of the Site supporting hydric soils would have historically been characterized by palustrine, evergreen, forested, persistent wetlands which were temporarily flooded (Cowardin, et al 1979). These areas likely supported one or more of the following plant communities: Bay

Forest, Pine Savanna, or Streamhead Pocosin (Nelson 1986). A preliminary wetland determination was performed in November 2009 to verify hydric soils and upland boundaries. Hydric soils were systematically sampled within the soil units throughout the Site. USACE wetland determination data forms were used at 18 collected data points and are provided in Appendix D, along with attendant soil profile and representative plant community photographs. Findings concluded that while a few disparities to the NRCS soil mapping were found, most were minor, and it appears the NRCS soils mapping of hydric soils is an appropriate surrogate for the jurisdictional wetland boundary. According to NRCS soil mapping, approximately 776.9 acres of jurisdictional wetlands are located on the Site.

2.5.4 Hydrology

2.5.4.1 Groundwater

Hydrology at the Site is driven by precipitation inputs and evapotranspiration, where most of the Site is predisposed to primarily vertical to radial fluctuations in the groundwater table. As gradients increase slightly closer to the headwater drainages and along the east and west Site boundaries, groundwater movement is dominated by semi-radial and lateral flow patterns.

2.5.4.2 Surface Water

Topographically, the Site is generally expressed as a relatively flat surface with five defined headwater drainages that fall to east and west from the center of the Site. During periods of high rainfall or where rainfall exceeds evapotranspiration, ground water levels rise to the surface and ponding is common. As groundwater levels rise, surface water and subsurface flows migrate toward localized depressional areas, and eventually migrate to the headwater drainages where water ponds and sheet flows in a down valley direction, gradually forming stream-like braided channels.

Under current conditions, through the drainage network, the surface water migration pattern has been short-circuited. The ditches currently collect surface runoff and groundwater (discharge) and convey it south into Loosing Swamp (see Figures 5 and 6, Appendix C). Some wetlands immediately adjacent to the ditches may currently experience some lateral drainage effects and a subsequent removal of the drainage network should reduce the rate of removal, thereby increasing residence time and making more water available to local aquifers and streams.

2.5.5 Federally and State-Listed Species

The following table provides the Federally-listed and State-listed species found within 2.0 miles of the Site. The data is based on a recent search on the South Carolina Heritage Trust Geographic Database of Rare and Endangered Species website. Potential habitat exists within the projects limits for most of the listed species. Further consultation with the South Carolina Division of Natural Resources (SCDNR) and United States Fish and Wildlife Service (USFWS) may be required to ensure that there will be no impacts to protected species.

Federally and State-Listed Species				
Common Name	Scientific Name	Status*		Habitat Present
		Federal	State	
Sweet Pitcher Plant	*Sarracenia rubra*		S4	Yes
Venus Fly Trap	*Dionaea muscipula*		S1	Yes
Bartrams Rose Gentain	*Sabatia bartramii*		SC	Yes
Wire-Leaved Dropseed	*Sporobolus teretifolius*		S1	Potential
One-Flower Balduina	*Balduina uniflora*		SC	Yes
Coastal Plain False Foxglove	*Agalinis aphylla*		SC	Yes
Carolina Grass-of-Parnassus	*Parnassia caroliniana*		S1/S2	Yes
Chaffseed	*Schwalbea americana*	FE	SE	Yes

* S1 – Critically imperiled state-wide
S2 – Imperiled state-wide
S4 – Apparently secure in state
SC – Species of concern
SE – State endangered
FE – Federally endangered

2.6: TECHNICAL APPROACH FOR THE PROPOSED MITIGATION

2.6.1 Conceptual Mitigation Work Plan

Plant community restoration at the Site will require strategies that use a direct and intensive course of action including the removal of the on-site drainage network, the removal of undesirable species followed by the introduction of desirable species, and the promotion of natural, fire-based disturbance regime.

Primary activities designed to restore the mosaic of characteristic plant communities will require the use of numerous forest management techniques including 1) selective harvesting of merchantable stands, 2) removal of non-merchantable stands, 3) installation of firebreaks, 3) a site preparation burn, 5) herbicide treatments, 6) removal of bedded rows, 7) site planting, and 8) implementation of annual or semi-annual prescribed fires.

Site alterations designed to restore and enhance characteristic groundwater, surface flow dynamics and wetland hydrology across the Site include: 1) removal of the existing road, 2) installation of several primary ditch plugs, 3) backfilling both primary and lateral ditches and 4) surface scarification, where necessary. The Final Mitigation Plan may also include the installation of a modified road network to provide access for ongoing forest and fire management.

The restoration concept outlined in Figures 8 and 9 (Appendix C) are expected to restore approximately 776.9 acres of wetlands and preserve approximately 185.1 acres of upland buffer. Specific restoration work is briefly discussed below.

2.6.2 Forest Management Practices

Selective Harvest of Merchantable Stands
The existing loblolly pine plantation is in various stages of rotation, including thinned and non-thinned merchantable stands. Restoration techniques for forest stand conversion from an existing loblolly pine plantation to a natural longleaf pine forest will require harvesting a substantial portion of the existing canopy to make way for the shade intolerant longleaf seedlings. It is expected that approximately 754 acres (307 acres of thinned merchantable stands and 447 acres of non-thinned merchantable stands) will be thinned to approximately 20 to 30 trees per acre. Leaving some existing over-story pines will provide several benefits including a more diverse vegetative structure and providing fine fuels to increase the effectiveness of subsequent fire management goals.

Removal of Non-Merchantable Stands
Stands of non-merchantable timber will be fully removed by crushing the existing vegetation in-place using a rolling drum chopper. This procedure may be followed by a hot fire and a second pass with the chopper, depending on exact site conditions. Approximately 61 acres of non-merchantable stands are expected to be prepared in this manner.

Site Preparation Burn
Following the selective harvest, a prescribed fire will be applied to the Site, either alone or in conjunction with some other mechanical or chemical method to remove competing understory vegetation. A growing season fire is usually used to rid an area of competing ground cover, clearing the area of hardwood sprouts and brush. Firebreaks will be placed around the area to prevent fire from escaping onto adjacent land.

Bedding Removal
Bedding for loblolly pines production was utilized throughout the Site. Removal and/or breaking of these bedding rows will be implemented during the harvesting and site preparation process.

Site Planting
Restoration of forested communities provides habitat for area wildlife and allows for development and expansion of characteristic wetland dependent species across the landscape. Plant community restoration within Site will include the planting of bare-root trees consistent with reference data, on-site observations, and plant community descriptions (SCDOT 2005). Variations in vegetative planting may occur based on topographic locations, localized hydrologic conditions, and hydraulic properties of the soil. Species expected to be used for this project may include the following canopy or sub-canopy elements. Figure 9 (Appendix C) identifies the proposed location of each target community on the Site. Plant community classifications from "The Natural Communities of South Carolina" (Nelson 1986) are provided in parentheses. Species distribution and densities will be determined during development of the Final Mitigation Plan.

Bay Forest (Bay Forest)
1. Loblolly Bay (*Gordonia lasianthus*)
2. Sweetbay Magnolia (*Magnolia virginiana*)
3. Red Bay (*Persea palustris*)
4. Pond Pine (*Pinus serotina*)
5. Swamp Tupelo (*Nyssa biflora*)

Bottomland Hardwoods (Streamhead Pocosin)
1. Red Maple (*Acer rubrum*)
2. Swamp Tupelo (*Nyssa biflora*)
3. Tulip Poplar (*Liriodendron tulipifera*)
4. Sweetbay Magnolia (*Magnolia virginiana*)
5. Sweetgum (*Liquidambar styraciflua*)
6. Pond Pine (*Pinus serotina*)

Pine Flatwoods (Pine Flatwoods)
1. Longleaf Pine (*Pinus palustris*)
2. Pond Pine (*Pinus serotina*)

Pine Wet Flatwoods (Pine Savanna)
1. Longleaf Pine (*Pinus palustris*)
2. Pond Pine (*Pinus serotina*)

Continuing Prescribed Burns

Establishment and conservation of the both the longleaf pine and the diverse ground cover species of the various longleaf dominated communities is maximized by fire return intervals of one to three years. The Final Mitigation Plan and Long-term Management Plan will specify a continuing program of prescribed burns starting approximately two years following planting.

2.6.3 Hydrologic Enhancement

Groundwater Modeling

DRAINMOD groundwater modeling software will be used to prepare a detailed water budget for the wetland restoration portion of the Project Site, pre- and post-restoration, by simulating shallow subsurface conditions, groundwater behavior, and the lateral effect of ditches within the Project Site on the depth to the groundwater table. Data sets to be developed for the modeling of water table hydrology include climatological, soils, growing season, and site geometry data.

DRAINMOD was developed by R.W. Skaggs, Ph.D., P.E., of North Carolina State University to simulate the performance of water table management systems. This model was originally developed to simulate the performance of agricultural drainage and water table control systems on sites with shallow water table conditions. DRAINMOD predicts water balances in the soil-water regime at the midpoint between two drains. The model is capable of calculating hourly values for water table depth, surface runoff, subsurface drainage, infiltration, and actual evapotranspiration over long periods referenced to climatological data. The reliability of DRAINMOD has been tested for a wide range of soil and climatological conditions. Results of tests in North Carolina, Ohio, Louisiana, and Florida indicate that the model can be used to reliably predict water table elevations and drain flow rates. DRAINMOD has also been used to evaluate wetland hydrology.

DRAINMOD was modified for application to wetland studies by accumulating the number of events wherein the water table rises above a specified depth and remains above that threshold depth for a given duration during the growing season. Inputs into DRAINMOD include rainfall data, soil and surface storage parameters, evapotranspiration rates, ditch depth and spacing, and hydraulic conductivity values.

Road Removal

The existing Site access road was constructed using the soil excavated during the installation of the two main ditches. The same soil will be used to backfill the ditches, therefore effectively removing the raised road from the Site. At the completion of channel backfilling, the finish grade will match that of the existing wetlands.

Ditch Plugs

Impermeable ditch plugs will be installed within the channel at three critical locations along the main ditches. The plugs will prevent the preferential migration of water through the unconsolidated backfill. The plugs will consist of clay material. Each plug will be backfilled in 2-foot lifts of vegetation free material and compacted into the bottom of the ditch. The earthen material may be obtained from local sources, if available. The plugs will consist of a core of impervious material and will be sufficiently wide and deep to form an imbedded overlap in the existing ditch banks and bed.

Channel Backfilling

All ditches will be backfilled using on-site material excavated from the road bed or from side-cast material adjacent to the ditches. Ditch removal may be implemented in the year after planting to provide the planted seedlings time to establish. Where vegetation has colonized spoil areas, rooting debris will be removed to the maximum extent feasible before insertion of earthen material into the ditch. The ditches will be filled, compacted, and graded to the approximate elevation of the adjacent wetland surface. Certain, non-critical channel sections may remain open to provided ephemeral pool habitat, dependent upon the availability of on-site fill material. Open channel sections will be isolated between effectively backfilled reaches to reduce potential for long term, preferential groundwater migration.

2.6.4 Monitoring Plan

Hydrology

Groundwater monitoring gauges will be installed to monitor groundwater levels in restored wetland areas. Hydrological sampling will take place throughout the growing season at intervals necessary to satisfy the hydrology success criteria within each wetland restoration area. Specific and measureable success criteria for hydrology within each of the wetland restoration areas will be determined for the Final Mitigation Plan.

Target hydrological characteristics will require a minimum regulatory criteria or supporting documentation for atypical dry years when success criterion is not achieved. To the extent that these areas support hydrophytic vegetation and constitute minor inclusions within the floodplain, these areas will have achieved success. If wetland parameters are marginal as indicated by vegetation and hydrological monitoring, consultation with USACE personnel may be undertaken to determine the extent of wetland restoration in these area.

Vegetation

After Site planting prior to the start of the growing season, an initial evaluation will be performed to determine initial species composition and density. Supplemental planting will be implemented, if necessary.

To provide quantitative vegetation sampling, sample plots will be randomly placed within the Site after planting. In each sample plot, vegetation parameters to be monitored include species composition and species density. Visual observations of the percent cover of shrub and herbaceous species will also be recorded.

The interim vegetative success criteria for the Site will be the survival of at least 320 stems per acre of planted trees in monitoring year 3. The final vegetative success criteria for the Site will be the survival of at least 260 planted stems per acre surviving in year in monitoring year 5.

2.6.5 Implementation Schedule

A schedule for the Joiner Bay Site is presented below based on Submittal of approval of this Conceptual Mitigation Plan in 4th Quarter 2010..

Project Task	Scheduled Completion Date
Task 1: Submit Recorded Conservation Easement	2nd Q 2011
Task 2: Submit Final Mitigation Plan	2nd Q 2011
Task 3: IRT Approval	2nd Q 2011
Task 4: Nationwide 404 Permit	2rd Q 2011
Task 5: Implement Hydrologic Restoration Measures	3rd Q 2011
Task 6: Site Preparation for Planting	3rd and 4th Q 2011
Task 7: Site Planting	1st Q 2012
Task 8: Baseline Report/Install Vegetation Plots	1st Q 2012
Task 9: Submit Year 1 Monitoring Plan	4th Q 2012
Task 10: Submit Year 2 Monitoring Plan	4th Q 2013
Task 11: Submit Year 3 Monitoring Plan	4th Q 2014
Task 12: Submit Year 4 Monitoring Plan	4th Q 2015
Task 12: Submit Year 5 Monitoring Plan	4th Q 2016

2.6.6 Adaptive Management

To address the risk associated with a failure to achieve the specified success criteria, two separate strategies will be employed. First, the project will be designed and built to include a credit reserve as insurance against a negative variance in the credits realized at the end of the monitoring period. Second, adaptive management actions will be taken at the earliest sign that any portion of the project is not on track to meet success criteria by the end of the monitoring period.

2.7: IMPACTS FOR WHICH COMPENSATORY MITIGATION IS BEING PROVIDED

See Section 1.3

2.8: REFERENCES

Cowardin, L.M., Carter, V., Golet, F.C., and LaRoe, E.T. 1979. Classification of Wetlands and Deepwater Habitats of the United States. United States Fish and Wildlife Service, Washington, DC.

Griffith, G.E., J.M. Omernik, J.A. Comstock, M.P. Schafale, W.H. McNab, D.R. Lenat, T.F. MacPherson, J.B. Glover, and V.B. Shelbourne. 2002. Ecoregions of North Carolina and South Carolina. U.S. Geological Survey, Reston, Virginia.

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USACE. 1987. Corps of Engineers Wetlands Delineation Manual. Tech. Rpt. Y-87-1, Waterways Experiment Station, COE, Vicksburg, MS.

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APPENDIX A: MITIGATION SUMMARY WORKSHEET

RESTORATION AND ENHANCEMENT MITIGATION FACTORS FOR WELAND AND OTHER WATERS OF THE U.S. EXCLUDING STREAMS

Factors	Options				
Net Improvement	Minimal Enhancement 0.1	<-->			Excellent Restoration 4
Control	NA 0	Covenant Private 0.1	Covenant POA 0.2	Conservation Easement 0.4	Transfer Fee Title Conservancy 0.6
Temporal Lag	NA 0	Over 20 -0.3	10 to 20 -0.2	5 to 10 -0.1	0 to 5 0
Credit Schedule	Schedule 5 0	Schedule 4 0.1	Schedule 3 0.2	Schedule 2 0.3	Schedule 1 0.4
Kind	Category 5 -0.1	Category 4 0	Category 3 0.2	Category 2 0.3	Category 1 0.4
Location	Zone 5 -0.1	Zone 4 0	Zone 3 0.2	Zone 2 0.3	Zone 1 0.4

PROPOSED RESTORATION OR ENHANCEMENT MITIGATION WORKSHEET

Factor	Streamhead Pocosin Restoration	Streamhead Pocosin Enhancement	Pine Savanna Restoration	Pine Savanna Enhancement	Bay Forest Restoration	Bay Forest Enhancement	Upland Buffer
Net Improvement	4.0	2.0	4.0	2.0	4.0	2.0	
Control	0.4	0.4	0.4	0.4	0.4	0.4	
Temporal Lag	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	
Credit Schedule	0.3	0.3	0.3	0.3	0.3	0.3	
Kind	0.4	0.4	0.4	0.4	0.4	0.4	
Location	0.3	0.3	0.3	0.3	0.3	0.3	
Sum of M factors	5.2	3.2	5.2	3.2	5.2	3.2	
Mitigation Area	20.7	146	109.6	392.8	17.1	90.7	185.1
M X A =	107.64	467.2	569.92	1256.96	88.92	290.24	

962 total acreage

Total Restoration/Enhancement Credits	2780.88		
Needed Credit	2663	originally needed	2286
		additional	377
Reserve Credit*	117.88		2663

*built-in reserve credit to address or account in variations for actual surveys, wetland descrepencies, and drainage effects

resulting credit derived from using a lateral influence of 250 ft (main ditch) and 50 ft (lateral ditch)

APPENDIX B:

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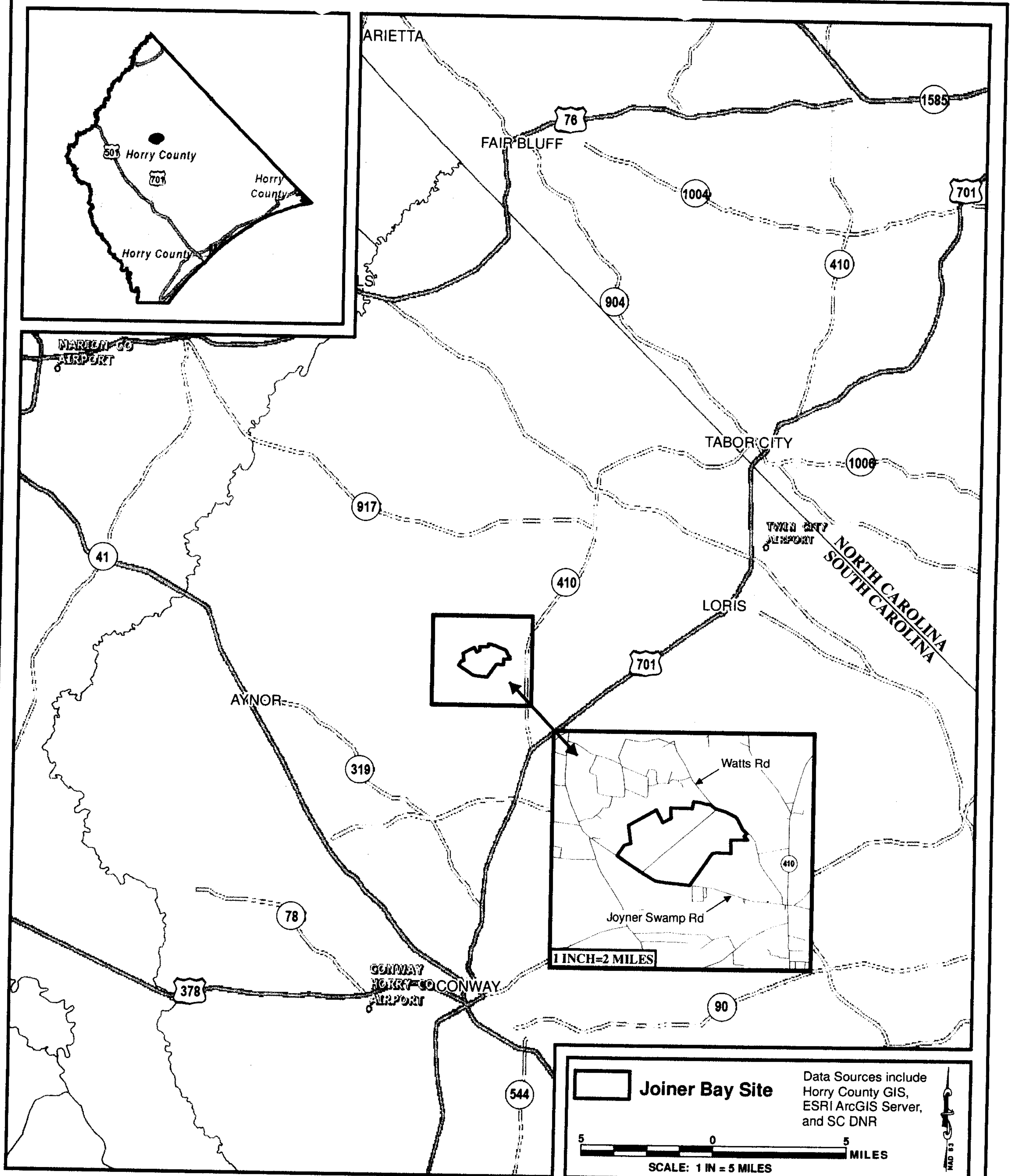
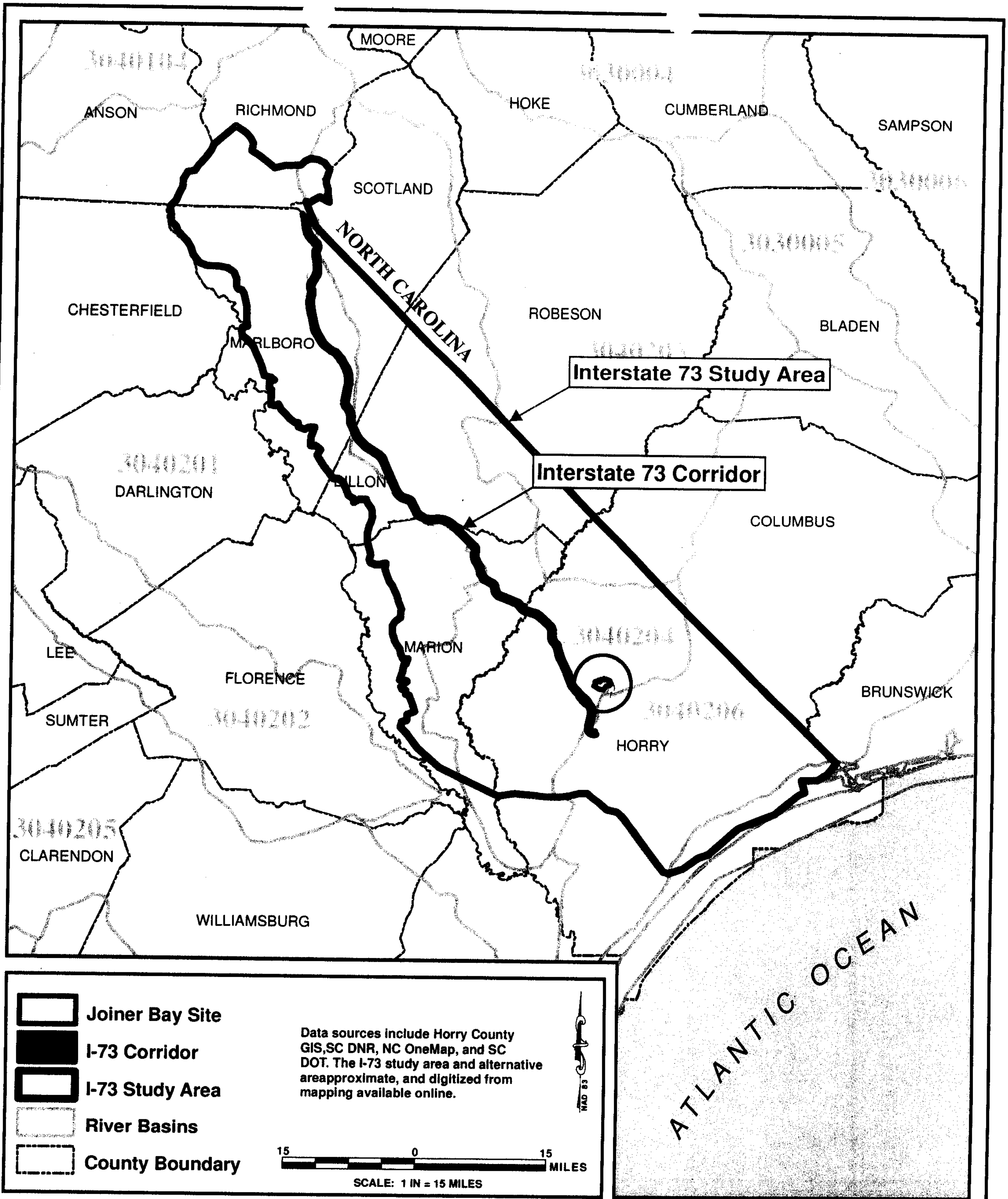
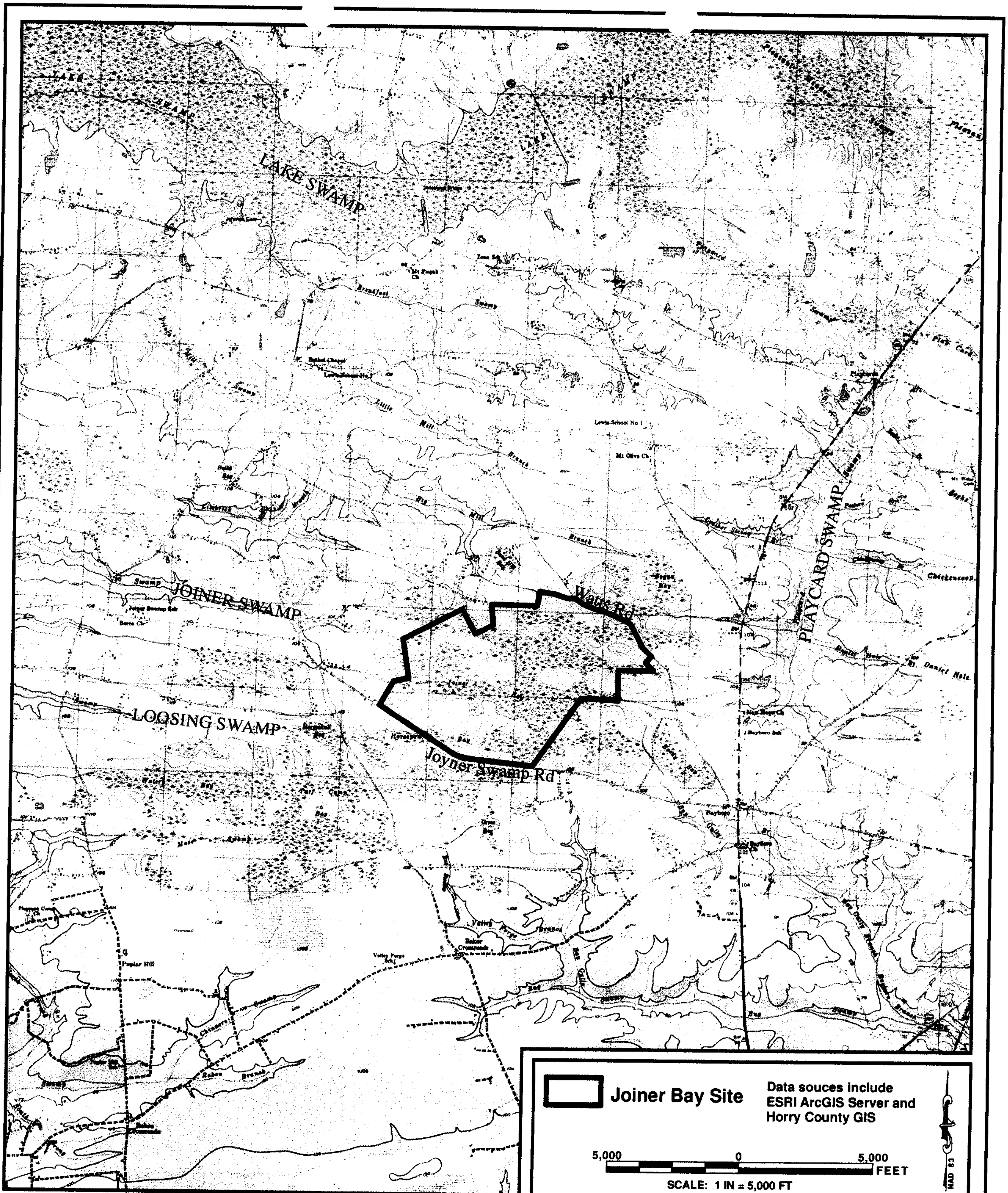
APPENDIX C: FIGURES



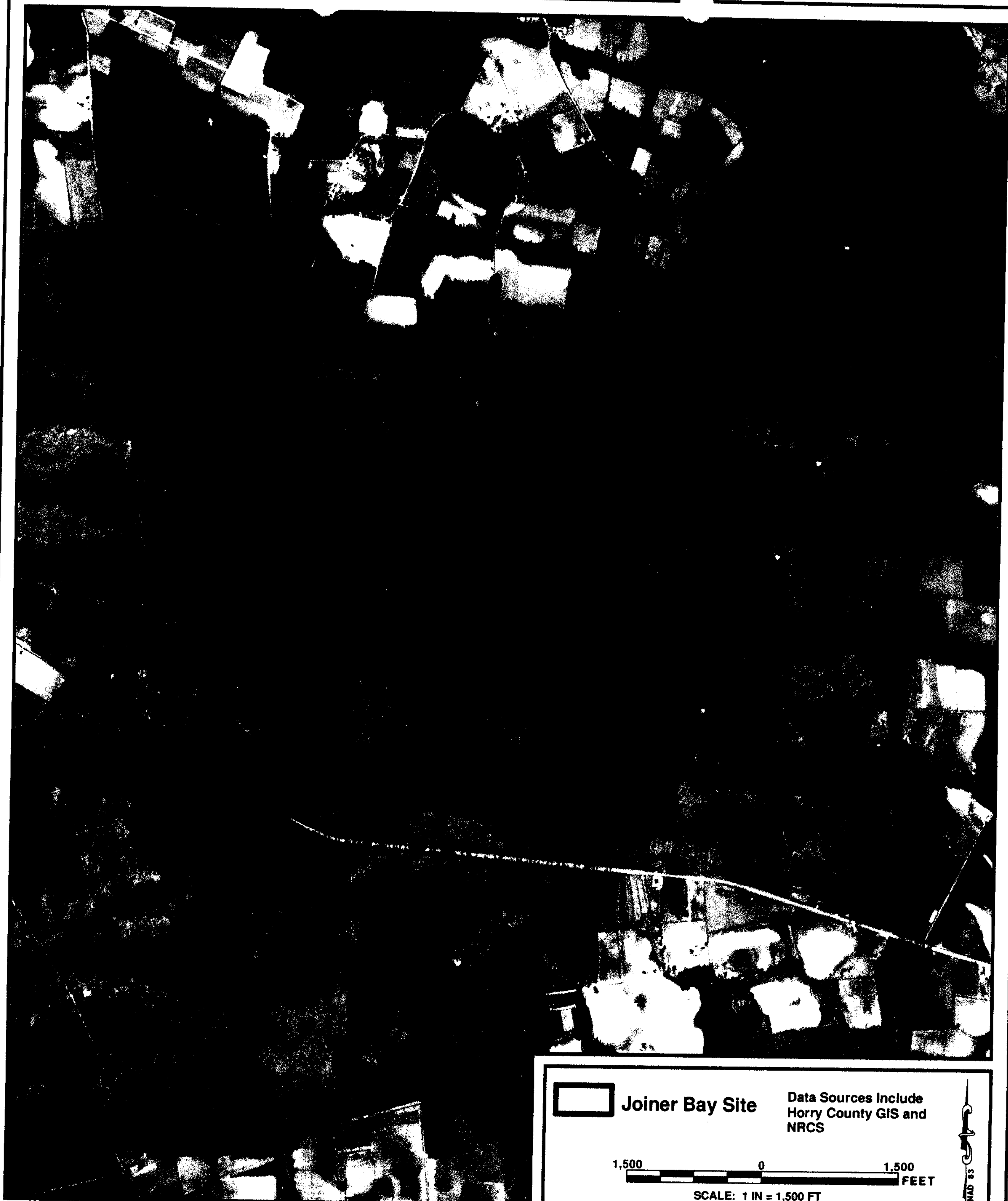
Prepared By:	Prepared For:			
PBSJ	EBX	**SITE LOCATION** **CONCEPTUAL MITIGATION PLAN** **JOINER BAY SITE** HORRY COUNTY, SOUTH CAROLINA	Dwn By: MCG Ckd By: JWG Date: AUG 2010 Project: 100010437	FIGURE **1**



Prepared By:	Prepared For:			FIGURE
PBSJ	EBX	USGS HYDROLOGIC UNIT MAP CONCEPTUAL MITIGATION PLAN JOINER BAY SITE HORRY COUNTY, SOUTH CAROLINA	Dwn By: MCG Ckd By: JWG Date: AUG 2010 Project: 100010437	2



Prepared By:	Prepared For:			
PBSJ	EBX	**SITE TOPOGRAPHY** **CONCEPTUAL MITIGATION PLAN** **JOINER BAY SITE** HORRY COUNTY, SOUTH CAROLINA	Dwn By: MCG Ckd By: JWG Date: AUG 2010 Project: 100010437	FIGURE **3**



Prepared By:

PBS&J

Prepared For:

EBX

1959 Aerial Photography

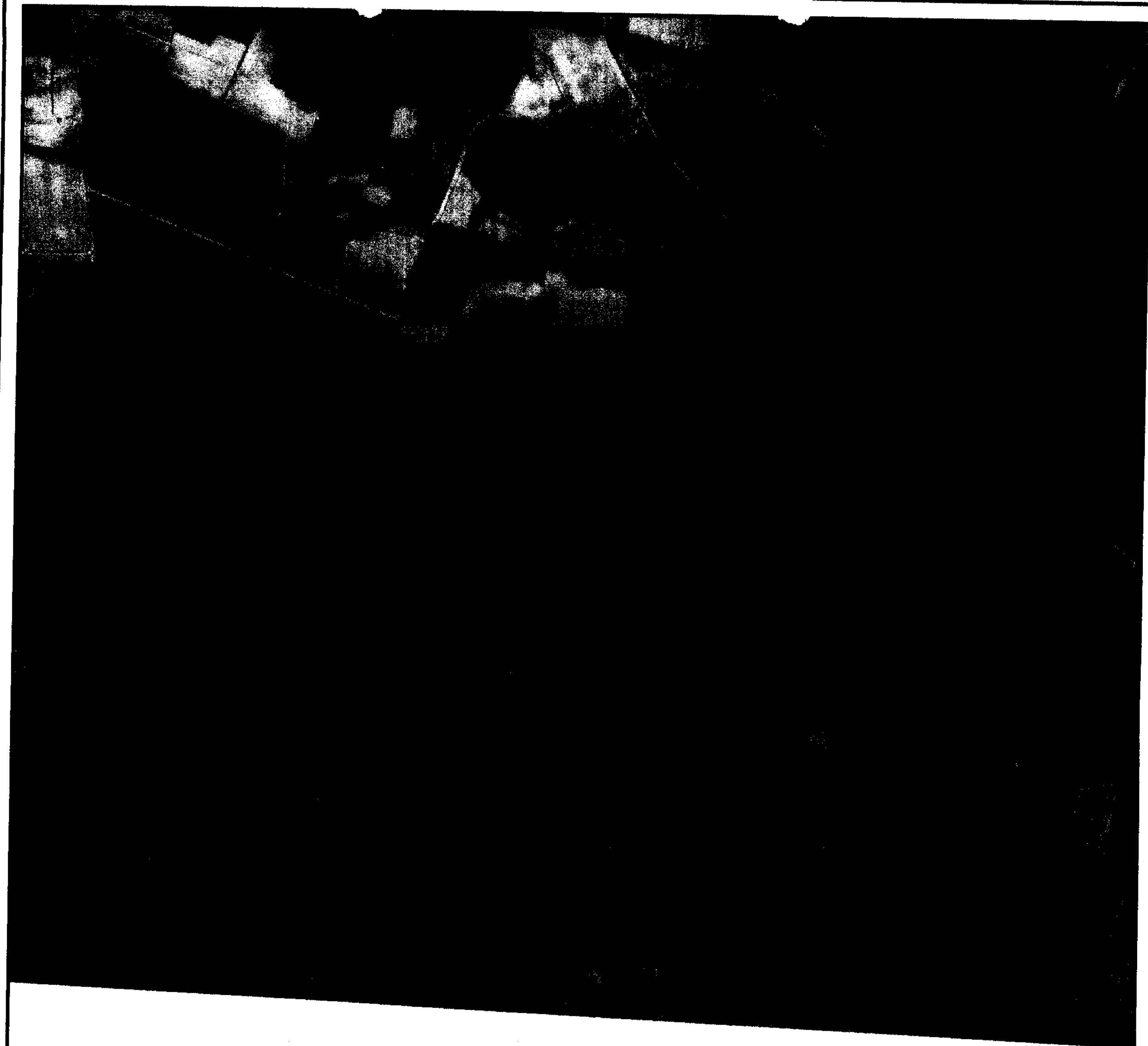
Conceptual Mitigation Plan
Joiner Bay Site

HORRY COUNTY, SOUTH CAROLINA

Dwn By:	MCG
Ckd By:	JWG
Date:	AUG 2010
Project:	100010437

FIGURE

4A



Joiner Bay Site

Data Sources Include Horry County GIS and NRCS

1,500 0 1,500 FEET

SCALE: 1 IN = 1,500 FT

NAD 83

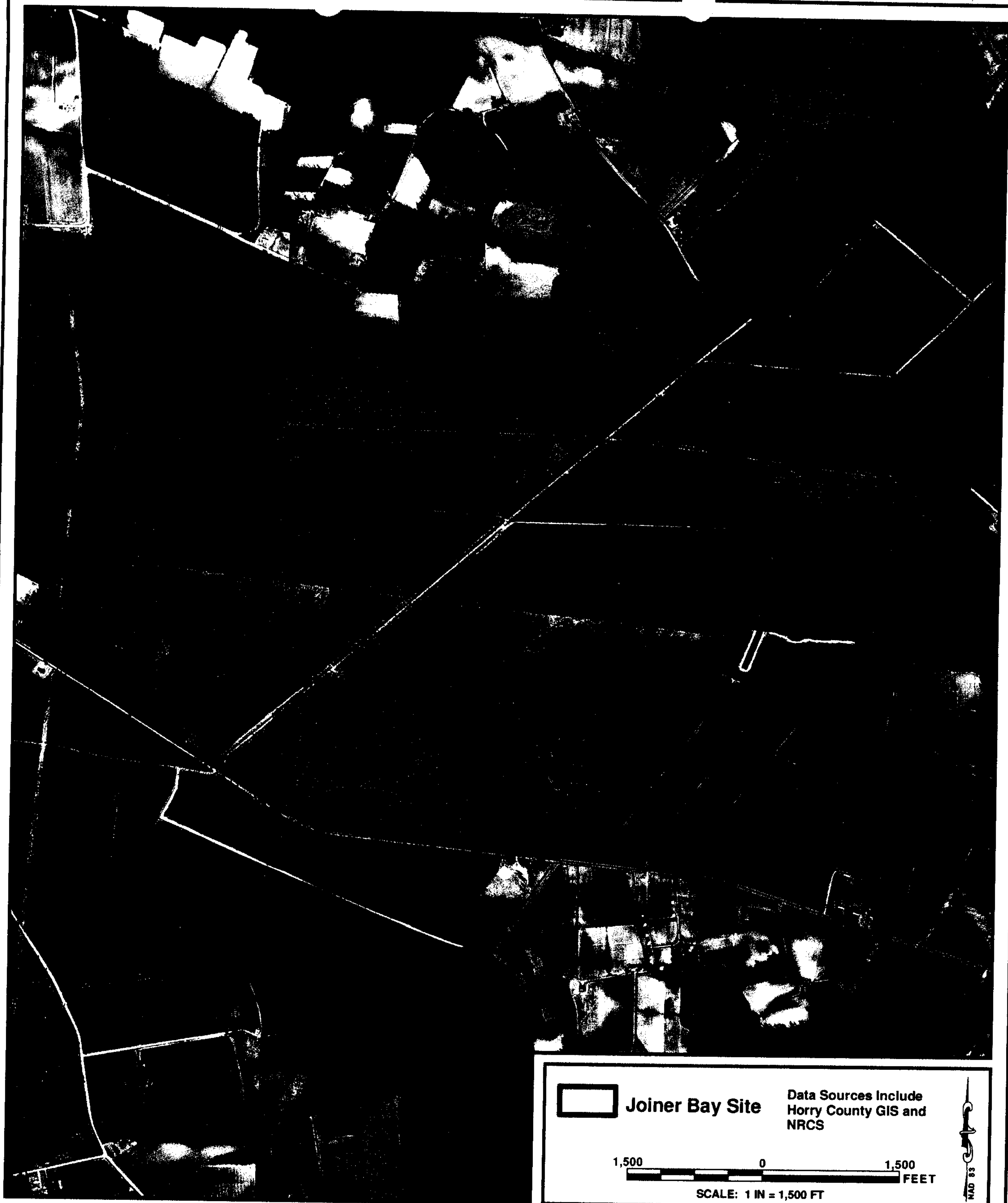
Prepared By: PBSJ

Prepared For: EBX

1983 AERIAL PHOTOGRAPHY
CONCEPTUAL MITIGATION PLAN
JOINER BAY SITE
HORRY COUNTY, SOUTH CAROLINA

Dwn By:	MCG
Ckd By:	JWG
Date:	AUG 2010
Project:	100010437

FIGURE 4B



Prepared By:

PBSJ

Prepared For:

EBX

1994 Aerial Photography

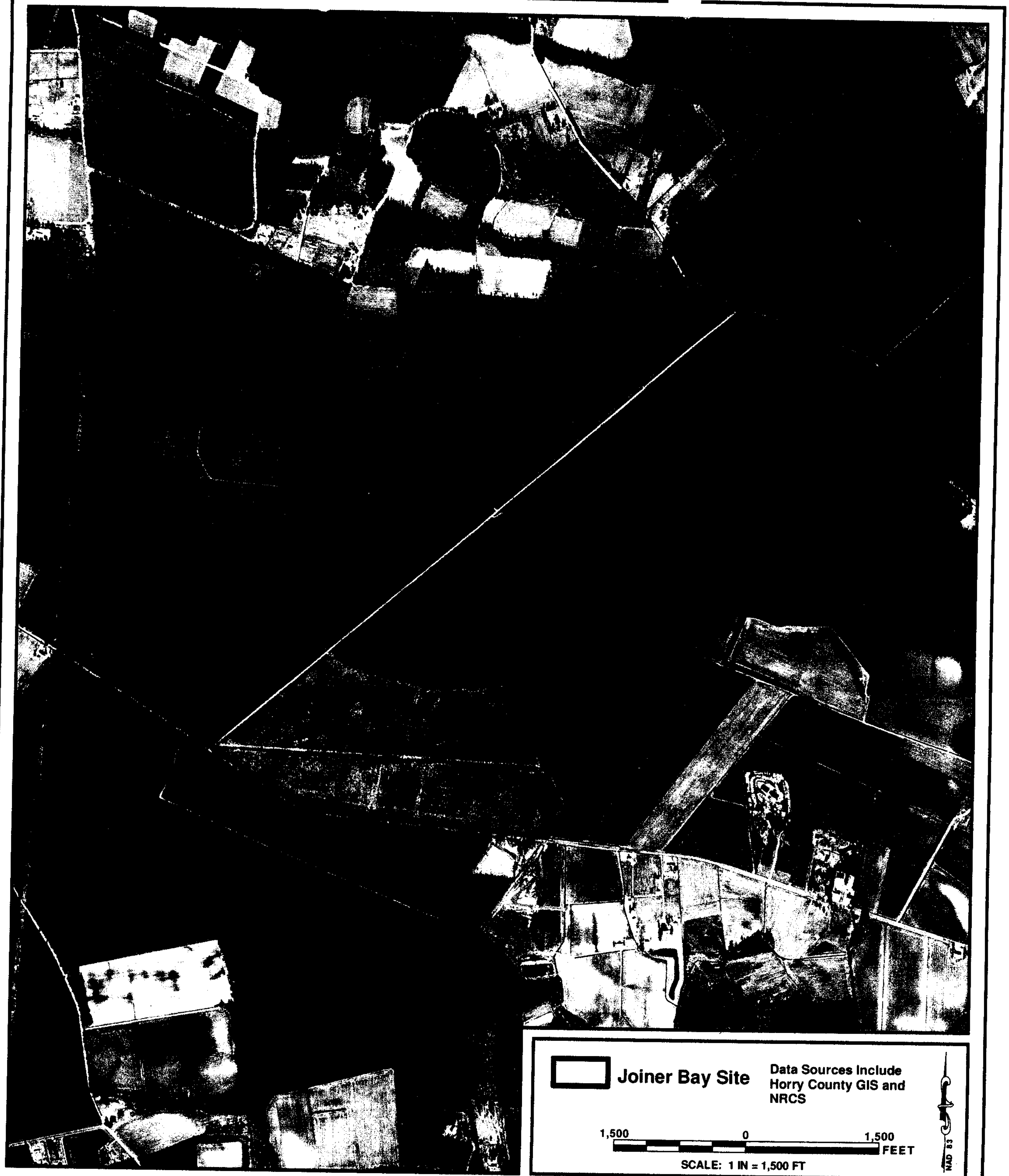
Conceptual Mitigation Plan
Joiner Bay Site

HORRY COUNTY, SOUTH CAROLINA

Dwn By:	MCG
Ckd By:	JWG
Date:	AUG 2010
Project:	100010437

FIGURE

4C



Prepared By: PBSJ

Prepared For: EBX

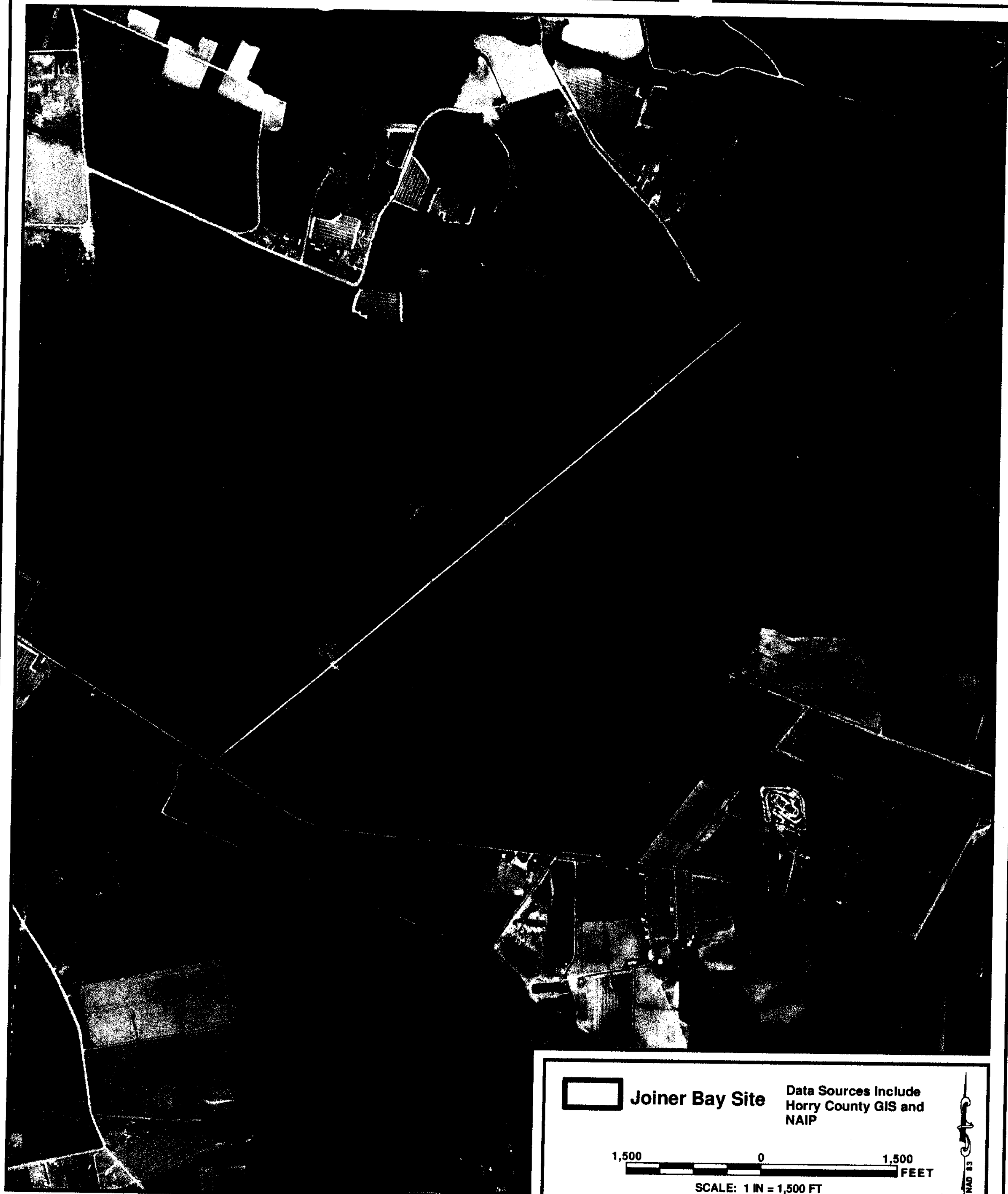
2006 Aerial Photography

Conceptual Mitigation Plan
Joiner Bay Site

HORRY COUNTY, SOUTH CAROLINA

Dwn By:	MCG
Ckd By:	JWG
Date:	AUG 2010
Project:	100010437

FIGURE 4D



Prepared By:

PBSJ

Prepared For:

EBX

2009 AERIAL PHOTOGRAPHY

CONCEPTUAL MITIGATION PLAN

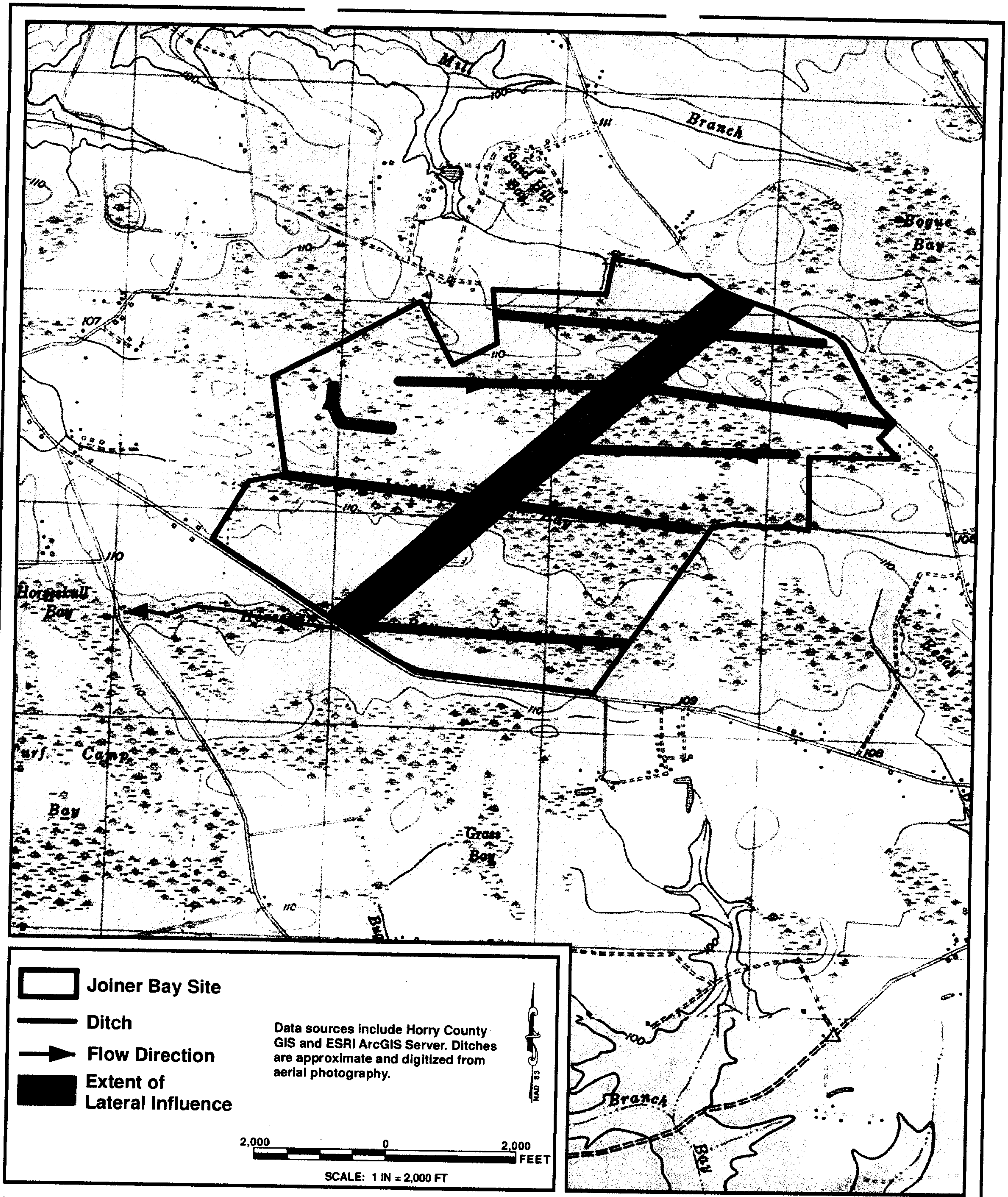
JOINER BAY SITE

HORRY COUNTY, SOUTH CAROLINA

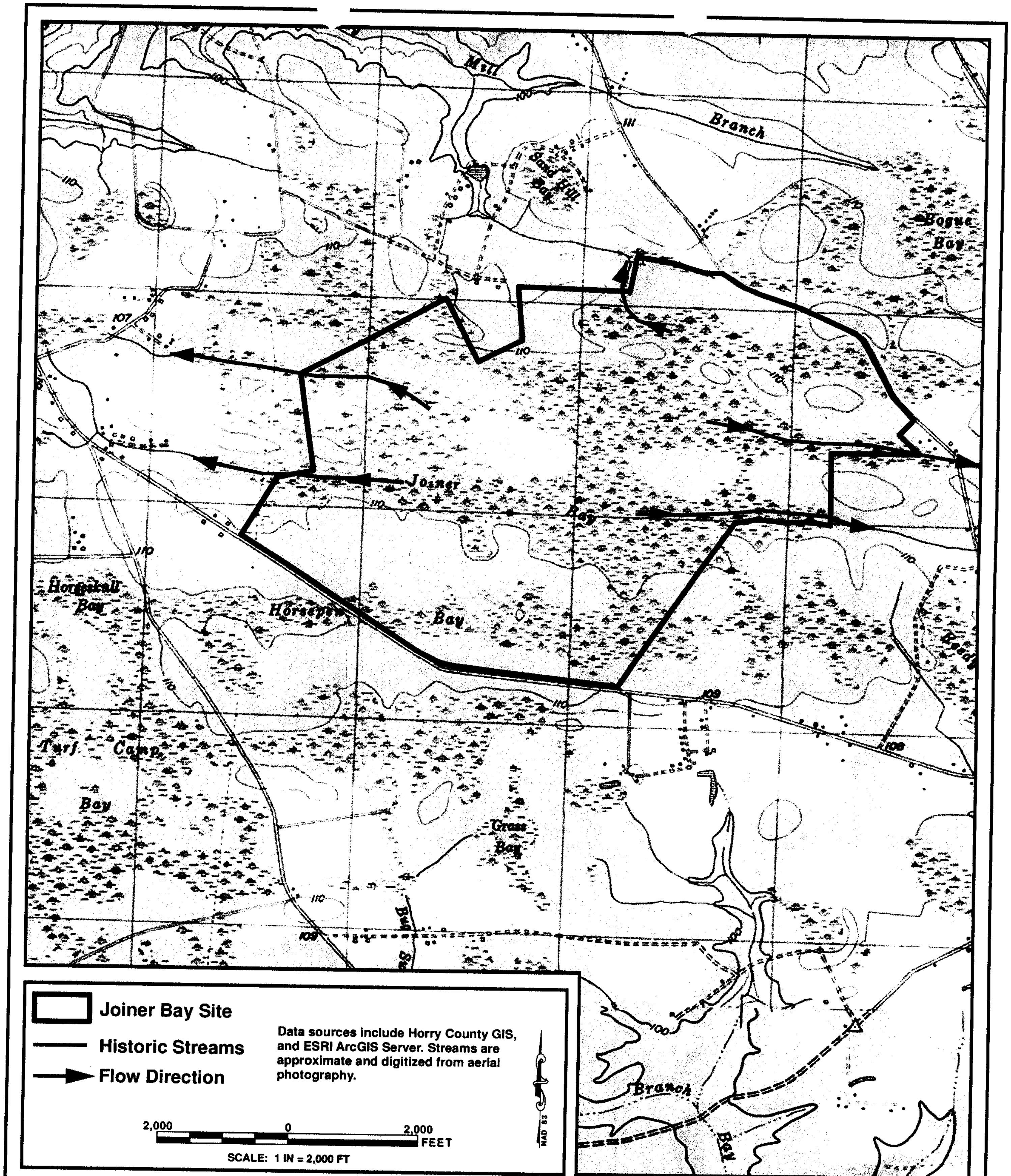
Dwn By:	MCG
Ckd By:	JWG
Date:	AUG 2010
Project:	100010437

FIGURE

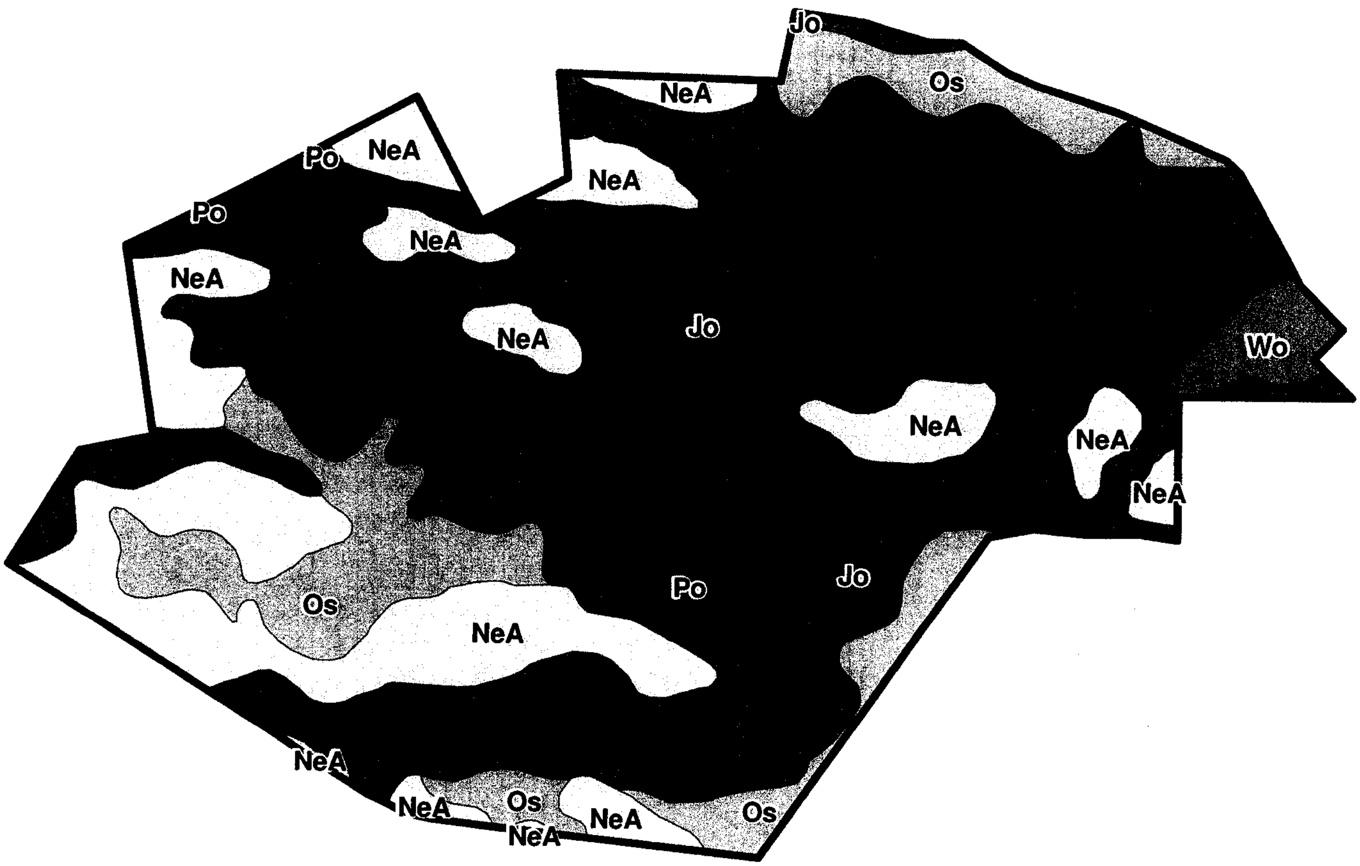
4E



Prepared By:	Prepared For:			FIGURE
PBSJ	EBX	**EXISTING HYDROLOGIC CONDITIONS** **CONCEPTUAL MITIGATION PLAN** **JOINER BAY SITE** HORRY COUNTY, SOUTH CAROLINA	Dwn By: MCG Ckd By: JWG Date: AUG 2010 Project: 100010437	**5**



Prepared By:	Prepared For:			
PBSJ	EBX	**HISTORIC HYDROLOGIC CONDITIONS** **CONCEPTUAL MITIGATION PLAN** **JOINER BAY SITE** HORRY COUNTY, SOUTH CAROLINA	Dwn By: MCG Ckd By: JWG Date: AUG 2010 Project: 100010437	FIGURE **6**



Joiner Bay Site (962.0 Acres)

NRCS Soil Units

Hydric Soils (776.8 Acres)

- Jo - Johnston Loam
- Os - Osier Loamy Sand
- Po - Pocomoke Fine Sandy Loam
- Wo - Woodington Fine Sandy Loam

Partially Hydric Soils (185.1 Acres)

- NeA - Nansemond Loamy Fine Sand

NAD 83

Data Sources Include Horry County GIS and NRCS SSURGO Database.

1,500 0 1,500 FEET

SCALE: 1 IN = 1,500 FT

Prepared By: PBS&J

Prepared For: EBX

SOILS MAP

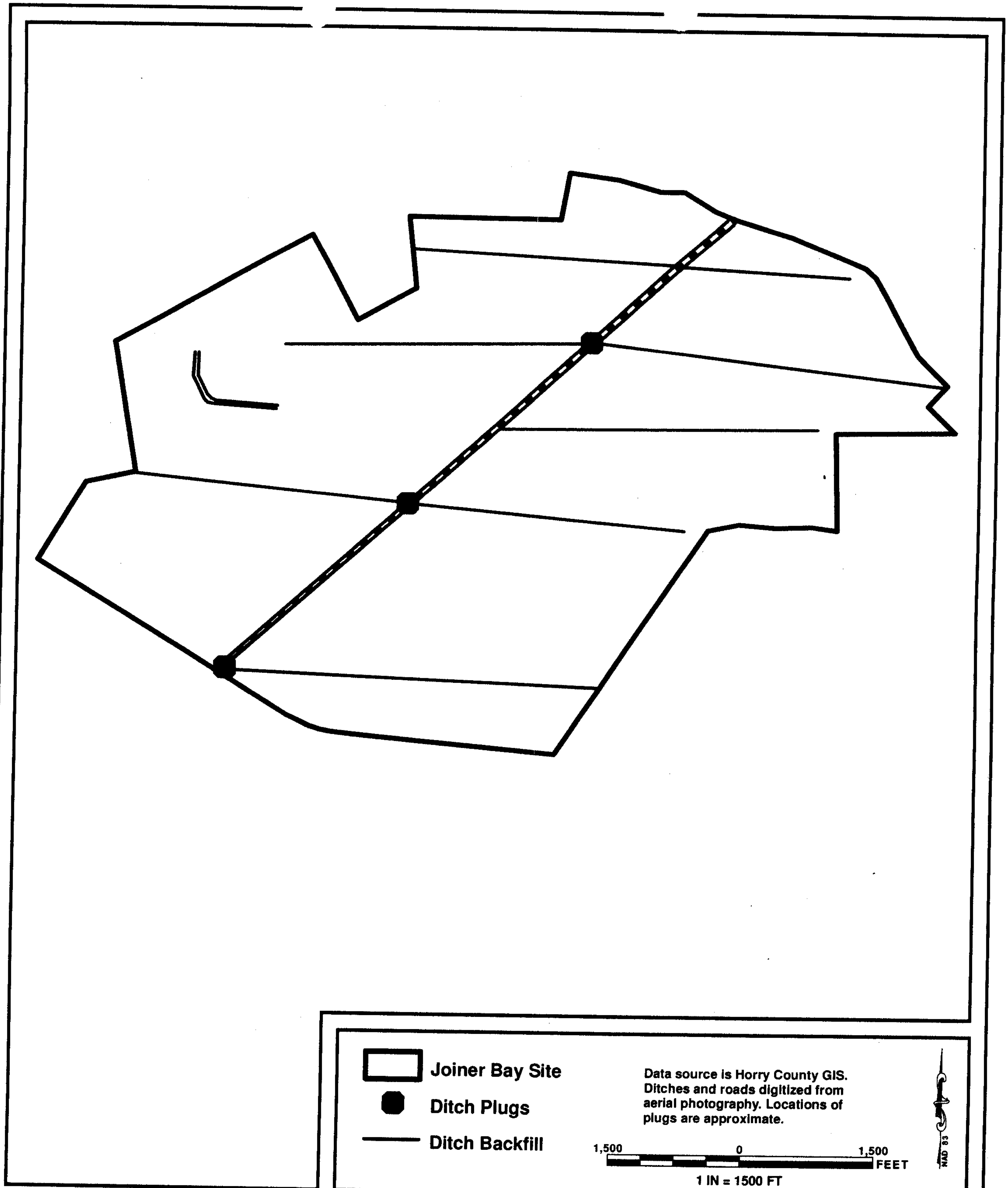
CONCEPTUAL MITIGATION PLAN

JOINER BAY SITE

HORRY COUNTY, SOUTH CAROLINA

Dwn By:	MCG
Ckd By:	JWG
Date:	AUG 2010
Project:	100010437

FIGURE 7



Prepared By:	Prepared For:			
PBSJ	EBX	**PROPOSED RESTORATION PLAN** CONCEPTUAL MITIGATION PLAN JOINER BAY SITE HORRY COUNTY, SOUTH CAROLINA	Dwn By: MCG Ckd By: JWG Date: AUG 2010 Project: 100010437	FIGURE 8

APPENDIX D: WETLAND DATA FORMS AND PHOTOS

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site:	Bayboro Wetland Restoration Site	Date:	11/12/2009
Applicant/Owner:	EBX	County:	Horry
Investigator:	Jens Geratz/Jeremy Schmid	State:	SC
Do Normal Circumstances exist on the site?	☒Yes ☐No	Community ID:	
Is the site significantly disturbed (Atypical Situation)?	☐Yes ☒No	Transect ID:	Wetland
Is the area a potential Problem Area? (If needed, explain on reverse.)	☐Yes ☒No	Plot ID:	SP1

VEGETATION

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
1. *Pinus taeda*	C	FAC	9.		
2. *Magnolia virginiana*	S	FACW+	10.		
3. *Lyonia lucida*	S	FACW	11.		
4. *Cyrilla racemiflora*	S	FACW	12.		
5. *Nyssa biflora*	S	OBL	13.		
6. *Smilax laurifolia*	V	FACW+	14.		
7.			15.		
8.			16.		

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-). 100

Remarks: Pine Plantation

HYDROLOGY

☐ Recorded Data (Describe in Remarks):
- ☐ Stream, Lake, or Tide Gauge
- ☐ Aerial Photographs
- ☐ Other

☒ No Recorded Data Available

Field Observations:

Depth of Surface Water: 4 (in.)

Depth to Free Water in Pit: 0 (in.)

Depth to Saturated Soil: 0 (in.)

Wetland Hydrology Indicators:

Primary Indicators:
- ☒ Inundated
- ☒ Saturated in Upper 12 Inches
- ☐ Water Marks
- ☐ Drift Lines
- ☐ Sediment Deposits
- ☐ Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- ☒ Oxidized Root Channels in Upper 12 Inches
- ☐ Water-Stained Leaves
- ☒ Local Soil Survey Data
- ☒ FAC-Neutral Test
- ☐ Other (Explain in Remarks)

Remarks:

SOILS

Map Unit Name (Series and Phase): Johnston loam

Drainage Class: Very poorly drained

Field Observations Confirm Mapped Type? ☐ Yes ☒ No

Taxonomy (Subgroup): *Cumulic Humaquepts*

Profile Descriptions:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/ Size/Contrast	Texture, Concretions, Structure, etc,
0-18		10YR 2/1			Mucky loam
18-24		10YR 3/1			Sandy loam
24-30+		10YR 4/1			Sandy clay loam

Hydric Soil Indicators:

- ☐ Histosol
- ☐ Histic Epipedon
- ☐ Sulfidic Odor
- ☐ Aquic Moisture Regime
- ☐ Reducing Conditions
- ☒ Gleyed or Low-Chroma Colors
- ☐ Concretions
- ☐ High Organic Content in Surface Layer in Sandy Soils
- ☐ Organic Streaking in Sandy Soils
- ☐ Listed on Local Hydric Soils List
- ☐ Listed on National Hydric Soils List
- ☐ Other (Explain in Remarks)

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present? ☒ Yes ☐ No (Check)

Wetland Hydrology Present? ☒ Yes ☐ No

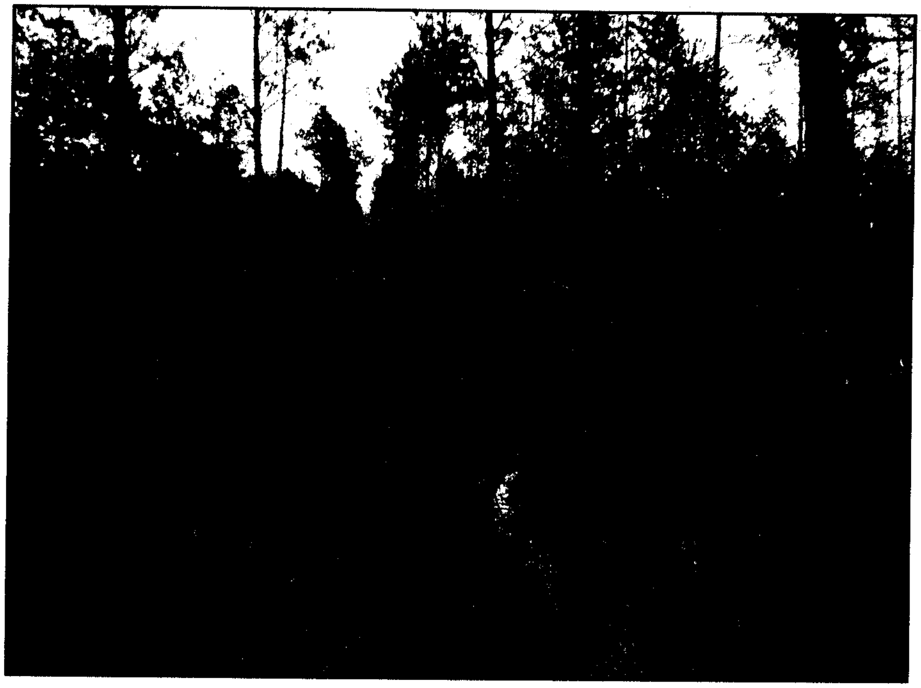
Hydric Soils Present? ☒ Yes ☐ No

(Check)

Is this Sampling Point Within a Wetland? ☒ Yes ☐ No

Remarks

SP1



Vegetation

Soil Profile

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site:	Bayboro Wetland Restoration Site	Date:	11/12/2009
Applicant/Owner:	EBX	County:	Horry
Investigator:	Jens Geratz/Jeremy Schmid	State:	SC
Do Normal Circumstances exist on the site?	☒Yes ☐No	Community ID:	
Is the site significantly disturbed (Atypical Situation)?	☐Yes ☒No	Transect ID:	Wetland
Is the area a potential Problem Area? (If needed, explain on reverse.)	☐Yes ☒No	Plot ID:	SP02

VEGETATION

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
1. *Pinus taeda*	C	FAC	9.		
2. *Ilex glabra*	S	FACW	10.		
3. *Cyrilla racemiflora*	S	FACW	11.		
4. *Magnolia virginiana*	S	FACW+	12.		
5. *Acer rubrum*	S	FAC	13.		
6. *Nyssa biflora*	S	OBL	14.		
7. *Persea palustris*	S	FACW	15.		
8.			16.		

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-). 100

Remarks: Pine Plantation

HYDROLOGY

☐ Recorded Data (Describe in Remarks):
- ☐ Stream, Lake, or Tide Gauge
- ☐ Aerial Photographs
- ☐ Other

☒ No Recorded Data Available

Field Observations:

Depth of Surface Water: 0 (in.)

Depth to Free Water in Pit: 0 (in.)

Depth to Saturated Soil: 0 (in.)

Wetland Hydrology Indicators:

Primary Indicators:
- ☐ Inundated
- ☒ Saturated in Upper 12 Inches
- ☐ Water Marks
- ☐ Drift Lines
- ☐ Sediment Deposits
- ☐ Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- ☒ Oxidized Root Channels in Upper 12 Inches
- ☐ Water-Stained Leaves
- ☒ Local Soil Survey Data
- ☒ FAC-Neutral Test
- ☐ Other (Explain in Remarks)

Remarks:

SOILS

Map Unit Name (Series and Phase): Pocomoke fine sandy loam

Drainage Class: Very poorly drained

Field Observations

Taxonomy (Subgroup): *Typic Umbraqualts*

Confirm Mapped Type? ☐ Yes ☒ No

Profile Descriptions:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/ Size/Contrast	Texture, Concretions, Structure, etc,
0-3		10YR 2/1			Sandy loam
3-8		10YR 3/1			Loamy loam
8-14		10YR 4/1			Loamy loam
14-30+		10YR 5/2	10Y 5/6	40%	Sand

Hydric Soil Indicators:

☐ Histosol
☐ Histic Epipedon
☐ Sulfidic Odor
☐ Aquic Moisture Regime
☐ Reducing Conditions
☒ Gleyed or Low-Chroma Colors
☐ Concretions
☐ High Organic Content in Surface Layer in Sandy Soils
☐ Organic Streaking in Sandy Soils
☐ Listed on Local Hydric Soils List
☐ Listed on National Hydric Soils List
☐ Other (Explain in Remarks)

Remarks:

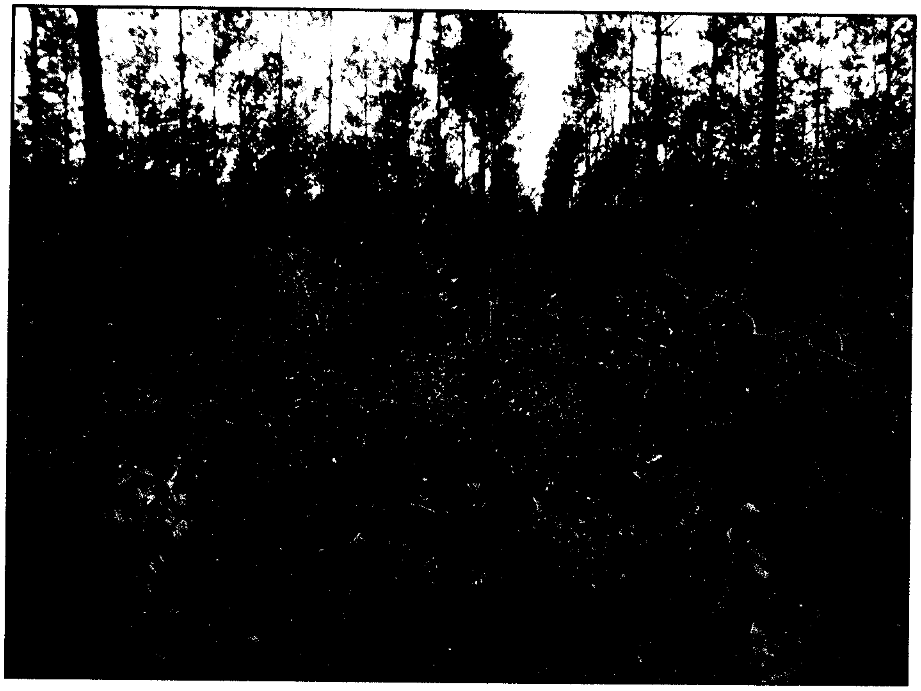
WETLAND DETERMINATION

Hydrophytic Vegetation Present? ☒ Yes ☐ No (Check)
Wetland Hydrology Present? ☒ Yes ☐ No
Hydric Soils Present? ☒ Yes ☐ No

(Check)
Is this Sampling Point Within a Wetland? ☒ Yes ☐ No

Remarks

SP2



Vegetation

Soil Profile

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site:	Bayboro Wetland Restoration Site	Date:	11/12/2009
Applicant/Owner:	EBX	County:	Horry
Investigator:	Jens Geratz/Jeremy Schmid	State:	SC
Do Normal Circumstances exist on the site?	☒Yes ☐No	Community ID:	
Is the site significantly disturbed (Atypical Situation)?	☐Yes ☒No	Transect ID:	Wetland
Is the area a potential Problem Area? (If needed, explain on reverse.)	☐Yes ☒No	Plot ID:	SP03

VEGETATION

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
1. *Pinus taeda*	C	FAC	9. *Pteridium aquilinum*	H	FACU
2. *Ilex coriacea*	S	FACW	10.		
3. *Persea palustris*	S	FACW	11.		
4. *Ilex glabra*	S	FACW	12.		
5. *Nyssa biflora*	S	OBL	13.		
6. *Vaccinium crassifolium*	S	FAC+	14.		
7. *Magnolia virginiana*	S	FACW+	15.		
8. *Cyrilla racemiflora*	S	FACW	16.		

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-). 89

Remarks: Pine Plantation

HYDROLOGY

☐ Recorded Data (Describe in Remarks):
- ☐ Stream, Lake, or Tide Gauge
- ☐ Aerial Photographs
- ☐ Other

☒ No Recorded Data Available

Field Observations:

Depth of Surface Water: 0 (in.)

Depth to Free Water in Pit: 0 (in.)

Depth to Saturated Soil: 0 (in.)

Wetland Hydrology Indicators:

Primary Indicators:
- ☐ Inundated
- ☒ Saturated in Upper 12 Inches
- ☐ Water Marks
- ☐ Drift Lines
- ☐ Sediment Deposits
- ☐ Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- ☒ Oxidized Root Channels in Upper 12 Inches
- ☐ Water-Stained Leaves
- ☒ Local Soil Survey Data
- ☒ FAC-Neutral Test
- ☐ Other (Explain in Remarks)

Remarks:

SOILS

Map Unit Name (Series and Phase): Nansemond loamy find sand

Drainage Class: Moderately well drained

Field Observations Confirm Mapped Type? ☐ Yes ☒ No

Taxonomy (Subgroup): *Aquic Hapludults*

Profile Descriptions:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/ Size/Contrast	Texture, Concretions, Structure, etc,
0-2		10YR 2/1			Sandy loam
2-12		10YR 4/1			Sandy loam
12-24		10YR 5/2	10YR 6/2	50%	Sandy loam
24-30+		10YR 6/3	10Y 5/6	40%	Sandy loam

Hydric Soil Indicators:

- ☐ Histosol
- ☐ Histic Epipedon
- ☐ Sulfidic Odor
- ☐ Aquic Moisture Regime
- ☐ Reducing Conditions
- ☒ Gleyed or Low-Chroma Colors
- ☐ Concretions
- ☐ High Organic Content in Surface Layer in Sandy Soils
- ☐ Organic Streaking in Sandy Soils
- ☐ Listed on Local Hydric Soils List
- ☐ Listed on National Hydric Soils List
- ☐ Other (Explain in Remarks)

Remarks:

WETLAND DETERMINATION

	(Check)
Hydrophytic Vegetation Present?	☒ Yes ☐ No
Wetland Hydrology Present?	☒ Yes ☐ No
Hydric Soils Present?	☒ Yes ☐ No

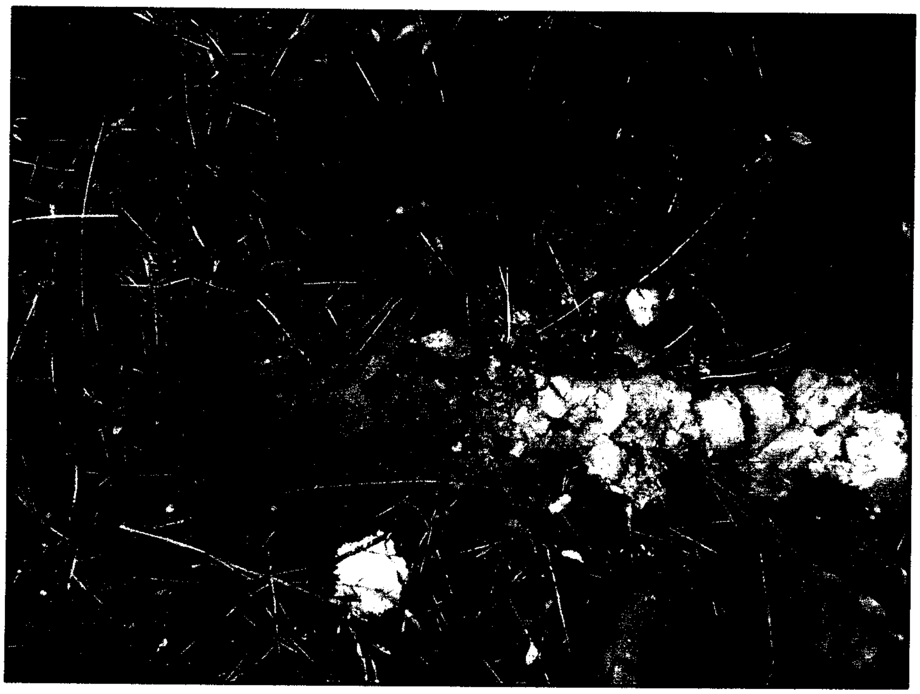
Is this Sampling Point Within a Wetland? (Check) ☒ Yes ☐ No

Remarks

Approved by HQUSACE 3/92
Forms version 1/02

SP3

Vegetation



Soil Profile

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site:	Bayboro Wetland Restoration Site	Date:	11/12/2009
Applicant/Owner:	EBX	County:	Horry
Investigator:	Jens Geratz/Jeremy Schmid	State:	SC
Do Normal Circumstances exist on the site?	☒Yes ☐No	Community ID:	
Is the site significantly disturbed (Atypical Situation)?	☐Yes ☒No	Transect ID:	Wetland
Is the area a potential Problem Area? (If needed, explain on reverse.)	☐Yes ☒No	Plot ID:	SP04

VEGETATION

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
1. *Pinus taeda*	C	FAC	9. *Acer rubrum*	S	FAC
2. *Ilex glabra*	S	FACW	10. *Pteridium aquilinum*	H	FACU
3. *Vaccinium crassifolium*	S	FAC+	11.		
4. *Clethra alnifolia*	S	FACW	12.		
5. *Gaylussacia frondosa*	S	FAC	13.		
6. *Morella cerifera*	S	FAC+	14.		
7. *Arundinaria gigantea*	S	FACW	15.		
8. *Cyrilla racemiflora*	S	FACW	16.		

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-). 100

Remarks: Pine Plantation

HYDROLOGY

☐ Recorded Data (Describe in Remarks):
- ☐ Stream, Lake, or Tide Gauge
- ☐ Aerial Photographs
- ☐ Other

☒ No Recorded Data Available

Field Observations:

Depth of Surface Water: 0 (in.)

Depth to Free Water in Pit: 6 (in.)

Depth to Saturated Soil: 4 (in.)

Wetland Hydrology Indicators:

Primary Indicators:
- ☐ Inundated
- ☒ Saturated in Upper 12 Inches
- ☐ Water Marks
- ☐ Drift Lines
- ☐ Sediment Deposits
- ☐ Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- ☐ Oxidized Root Channels in Upper 12 Inches
- ☐ Water-Stained Leaves
- ☐ Local Soil Survey Data
- ☒ FAC-Neutral Test
- ☐ Other (Explain in Remarks)

Remarks:

SOILS

Map Unit Name (Series and Phase): Nansemond loamy find sand

Drainage Class: Moderately well drained

Field Observations

Taxonomy (Subgroup): *Aquic Hapludults*

Confirm Mapped Type? ☐ Yes ☒ No

Profile Descriptions:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/ Size/Contrast	Texture, Concretions, Structure, etc,
0-5		10YR 2/1			Sandy loam
5-8		10YR 3/2			Sandy loam
8-18		2.5Y 5/2			Sandy loam
18-24		2.5Y 5/4	10YR 7/2	50%	Sandy loam
24-30+		10YR 6/8	10YR 7/2	20%	Sand

Hydric Soil Indicators:

- ☐ Histosol
- ☐ Histic Epipedon
- ☐ Sulfidic Odor
- ☐ Aquic Moisture Regime
- ☐ Reducing Conditions
- ☐ Gleyed or Low-Chroma Colors
- ☐ Concretions
- ☐ High Organic Content in Surface Layer in Sandy Soils
- ☐ Organic Streaking in Sandy Soils
- ☐ Listed on Local Hydric Soils List
- ☐ Listed on National Hydric Soils List
- ☐ Other (Explain in Remarks)

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present? ☒ Yes ☐ No (Check)

Wetland Hydrology Present? ☒ Yes ☐ No

Hydric Soils Present? ☐ Yes ☒ No

(Check)

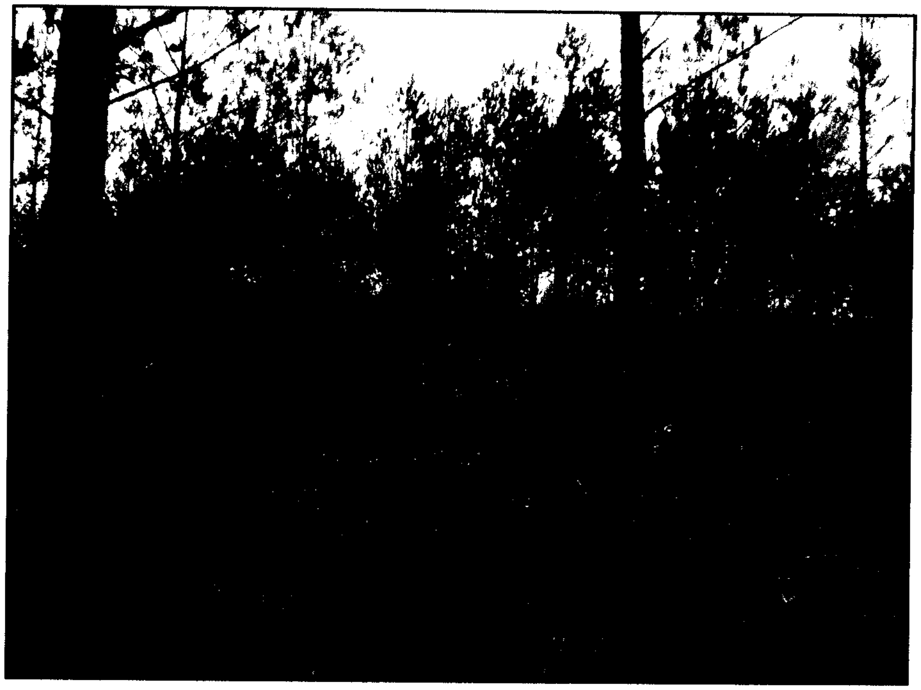
Is this Sampling Point Within a Wetland? ☐ Yes ☒ No

Remarks

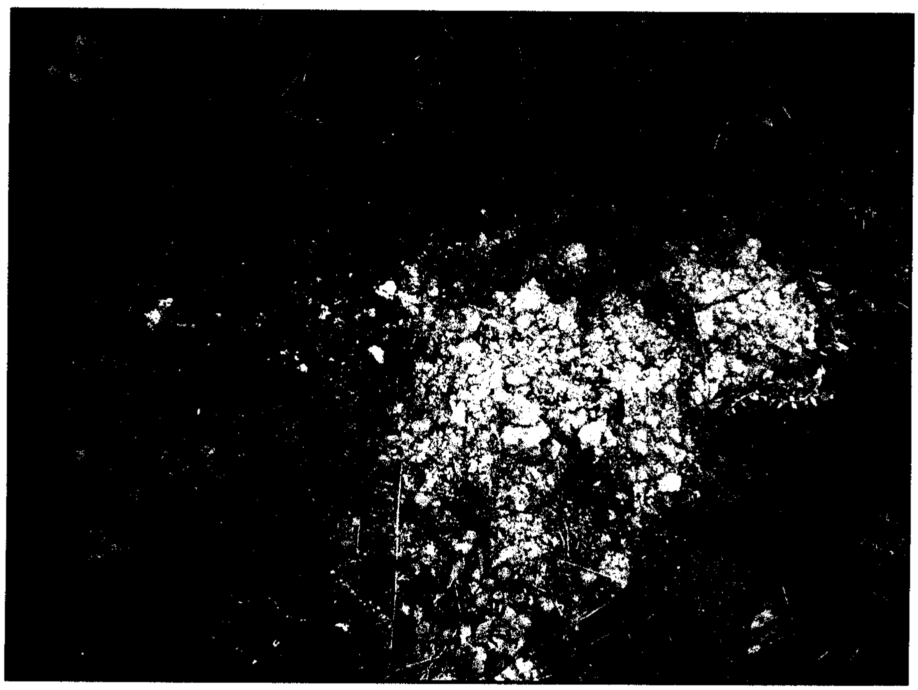
Approved by HQUSACE 3/92

Forms version 1/02

SP4



Vegetation



Soil Profile

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site:	Bayboro Wetland Restoration Site	Date:	11/12/2009
Applicant/Owner:	EBX	County:	Horry
Investigator:	Jens Geratz/Jeremy Schmid	State:	SC
Do Normal Circumstances exist on the site?	☒Yes ☐No	Community ID:	
Is the site significantly disturbed (Atypical Situation)?	☐Yes ☒No	Transect ID:	Wetland
Is the area a potential Problem Area? (If needed, explain on reverse.)	☐Yes ☒No	Plot ID:	SP05

VEGETATION

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
1. *Pinus taeda*	C	FAC	9.		
2. *Clethra alnifolia*	S	FACW	10.		
3. *Persea palustris*	S	FACW	11.		
4. *Lyonia lucida*	S	FACW	12.		
5. *Cyrilla racemiflora*	S	FACW	13.		
6. *Acer rubrum*	S	FAC	14.		
7. *Smilax laurifolia*	V	FACW+	15.		
8. *Woodwardia virginica*	H	OBL	16.		

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-). 100

Remarks: Pine Plantation

HYDROLOGY

☐ Recorded Data (Describe in Remarks):
- ☐ Stream, Lake, or Tide Gauge
- ☐ Aerial Photographs
- ☐ Other

☒ No Recorded Data Available

Field Observations:

Depth of Surface Water: 1 (in.)

Depth to Free Water in Pit: 0 (in.)

Depth to Saturated Soil: 0 (in.)

Wetland Hydrology Indicators:

Primary Indicators:
- ☒ Inundated
- ☒ Saturated in Upper 12 Inches
- ☐ Water Marks
- ☐ Drift Lines
- ☐ Sediment Deposits
- ☐ Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- ☐ Oxidized Root Channels in Upper 12 Inches
- ☒ Water-Stained Leaves
- ☐ Local Soil Survey Data
- ☒ FAC-Neutral Test
- ☐ Other (Explain in Remarks)

Remarks:

SOILS

Map Unit Name (Series and Phase): Johnston loam

Drainage Class: Very poorly drained

Field Observations Confirm Mapped Type? ☐ Yes ☒ No

Taxonomy (Subgroup): *Cumulic Humaquepts*

Profile Descriptions:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/ Size/Contrast	Texture, Concretions, Structure, etc,
0-16		10YR 2/1			Mucky loam
16-24		10YR 3/1			Sandy loam
24-30+		10YR 4/1			Sandy clay loam

Hydric Soil Indicators:

- ☐ Histosol
- ☐ Histic Epipedon
- ☐ Sulfidic Odor
- ☐ Aquic Moisture Regime
- ☐ Reducing Conditions
- ☒ Gleyed or Low-Chroma Colors
- ☐ Concretions
- ☐ High Organic Content in Surface Layer in Sandy Soils
- ☐ Organic Streaking in Sandy Soils
- ☐ Listed on Local Hydric Soils List
- ☐ Listed on National Hydric Soils List
- ☐ Other (Explain in Remarks)

Remarks:

WETLAND DETERMINATION

	(Check)
Hydrophytic Vegetation Present?	☒ Yes ☐ No
Wetland Hydrology Present?	☒ Yes ☐ No
Hydric Soils Present?	☐ Yes ☒ No

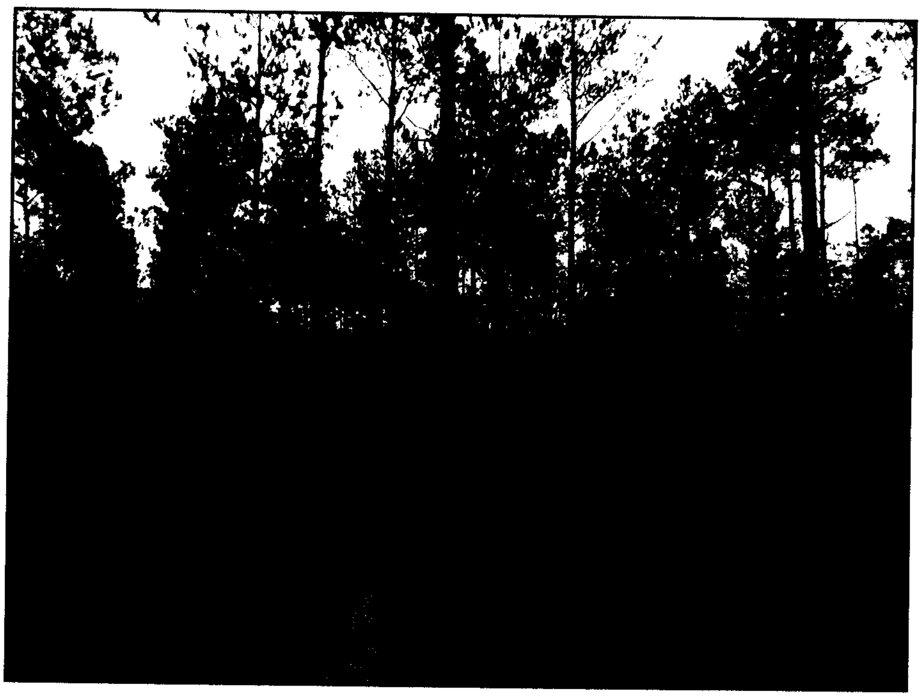
	(Check)
Is this Sampling Point Within a Wetland?	☐ Yes ☒ No

Remarks

Approved by HQUSACE 3/92

Forms version 1/02

SP5



Vegetation

No Photo Available

Soil Profile

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site:	Bayboro Wetland Restoration Site	Date:	11/12/2009
Applicant/Owner:	EBX	County:	Horry
Investigator:	Jens Geratz/Jeremy Schmid	State:	SC
Do Normal Circumstances exist on the site?	☒Yes ☐No	Community ID:	
Is the site significantly disturbed (Atypical Situation)?	☐Yes ☒No	Transect ID:	Wetland
Is the area a potential Problem Area? (If needed, explain on reverse.)	☐Yes ☒No	Plot ID:	SP06

VEGETATION

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
1. *Pinus taeda*	C	FAC	9.		
2. *Cyrilla racemiflora*	S	FACW	10.		
3. *Gaylussacia frondosa*	S	FAC	11.		
4. *Persea palustris*	S	FACW	12.		
5. *Magnolia virginiana*	S	FACW+	13.		
6. *Ilex glabra*	S	FACW	14.		
7. *Smilax laurifolia*	V	FACW+	15.		
8. *Eupatorium capillifolium*	H	FACU	16.		

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-). 88

Remarks: Pine Plantation

HYDROLOGY

☐ Recorded Data (Describe in Remarks):
- ☐ Stream, Lake, or Tide Gauge
- ☐ Aerial Photographs
- ☐ Other

☒ No Recorded Data Available

Field Observations:

Depth of Surface Water: 0 (in.)

Depth to Free Water in Pit: 6 (in.)

Depth to Saturated Soil: 4 (in.)

Wetland Hydrology Indicators:

Primary Indicators:
- ☐ Inundated
- ☒ Saturated in Upper 12 Inches
- ☐ Water Marks
- ☐ Drift Lines
- ☐ Sediment Deposits
- ☐ Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- ☐ Oxidized Root Channels in Upper 12 Inches
- ☐ Water-Stained Leaves
- ☐ Local Soil Survey Data
- ☒ FAC-Neutral Test
- ☐ Other (Explain in Remarks)

Remarks:

SOILS

Map Unit Name (Series and Phase): Osier loamy sand

Drainage Class: Poorly drained

Field Observations

Taxonomy (Subgroup): *Typic Psammaquents*

Confirm Mapped Type? ☐ Yes ☒ No

Profile Descriptions:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/ Size/Contrast	Texture, Concretions, Structure, etc,
0-10		10YR 2/1			Loam
10-14		10YR 3/1			Sandy loam
14-26+		10YR 4/1			Loamy sand

Hydric Soil Indicators:

- ☐ Histosol
- ☐ Histic Epipedon
- ☐ Sulfidic Odor
- ☐ Aquic Moisture Regime
- ☐ Reducing Conditions
- ☒ Gleyed or Low-Chroma Colors
- ☐ Concretions
- ☐ High Organic Content in Surface Layer in Sandy Soils
- ☐ Organic Streaking in Sandy Soils
- ☐ Listed on Local Hydric Soils List
- ☐ Listed on National Hydric Soils List
- ☐ Other (Explain in Remarks)

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present? ☒ Yes ☐ No (Check)

Wetland Hydrology Present? ☒ Yes ☐ No

Hydric Soils Present? ☒ Yes ☐ No

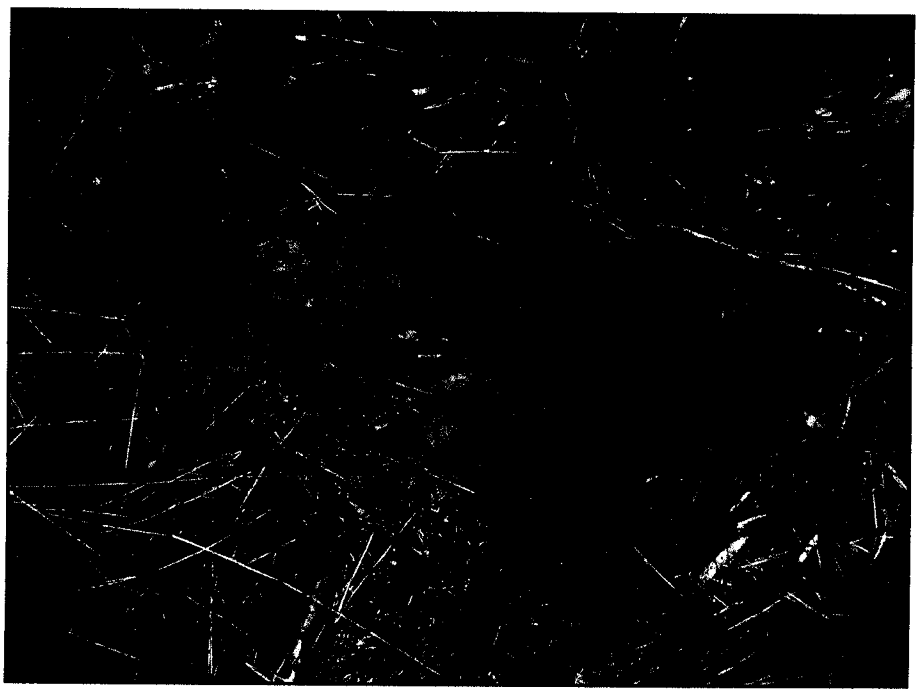
(Check)

Is this Sampling Point Within a Wetland? ☒ Yes ☐ No

Remarks

SP6

Vegetation



Soil Profile

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site:	Bayboro Wetland Restoration Site	Date:	11/12/2009
Applicant/Owner:	EBX	County:	Horry
Investigator:	Jens Geratz/Jeremy Schmid	State:	SC
Do Normal Circumstances exist on the site?	☒Yes ☐No	Community ID:	
Is the site significantly disturbed (Atypical Situation)?	☐Yes ☒No	Transect ID:	Wetland
Is the area a potential Problem Area? (If needed, explain on reverse.)	☐Yes ☒No	Plot ID:	SP07

VEGETATION

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
1. *Pinus taeda*	C	FAC	9.		
2. *Cyrilla racemiflora*	S	FACW	10.		
3. *Lyonia lucida*	S	FACW	11.		
4. *Ilex glabra*	S	FACW	12.		
5. *Smilax laurifolia*	V	FACW+	13.		
6. *Woodwardia virginica*	H	OBL	14.		
7.			15.		
8.			16.		

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-). 100

Remarks: Pine Plantation

HYDROLOGY

☐ Recorded Data (Describe in Remarks):
- ☐ Stream, Lake, or Tide Gauge
- ☐ Aerial Photographs
- ☐ Other

☒ No Recorded Data Available

Field Observations:

Depth of Surface Water: 0 (in.)

Depth to Free Water in Pit: 0 (in.)

Depth to Saturated Soil: 0 (in.)

Wetland Hydrology Indicators:

Primary Indicators:
- ☐ Inundated
- ☒ Saturated in Upper 12 Inches
- ☐ Water Marks
- ☐ Drift Lines
- ☐ Sediment Deposits
- ☐ Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- ☒ Oxidized Root Channels in Upper 12 Inches
- ☐ Water-Stained Leaves
- ☒ Local Soil Survey Data
- ☒ FAC-Neutral Test
- ☐ Other (Explain in Remarks)

Remarks:

SOILS

Map Unit Name (Series and Phase):	Pocomoke fine sandy loam	Drainage Class:	Very poorly drained
		Field Observations	
Taxonomy (Subgroup):	*Typic Umbraqualts*	Confirm Mapped Type?	☐ Yes ☒ No

Profile Descriptions:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/ Size/Contrast	Texture, Concretions, Structure, etc,
0-9		10YR 2/1			Loam
9-24+		10YR 4/1			Clay

Hydric Soil Indicators:

- ☐ Histosol
- ☐ Histic Epipedon
- ☐ Sulfidic Odor
- ☐ Aquic Moisture Regime
- ☐ Reducing Conditions
- ☒ Gleyed or Low-Chroma Colors
- ☐ Concretions
- ☐ High Organic Content in Surface Layer in Sandy Soils
- ☐ Organic Streaking in Sandy Soils
- ☐ Listed on Local Hydric Soils List
- ☐ Listed on National Hydric Soils List
- ☐ Other (Explain in Remarks)

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	☒ Yes ☐ No (Check)	
Wetland Hydrology Present?	☒ Yes ☐ No	(Check)
Hydric Soils Present?	☒ Yes ☐ No	Is this Sampling Point Within a Wetland? ☒ Yes ☐ No

Remarks

Approved by HQUSACE 3/92

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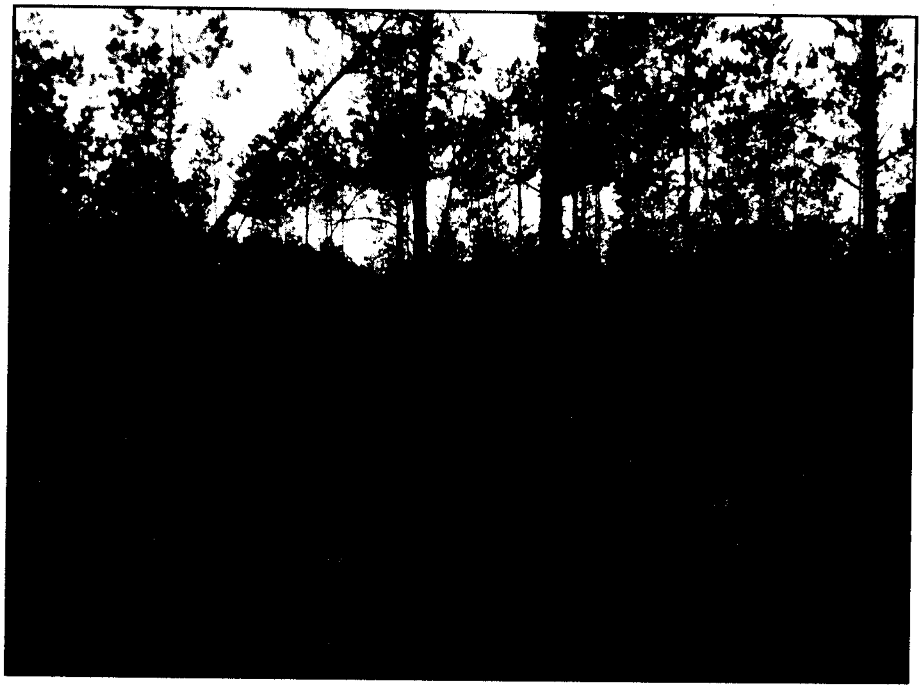
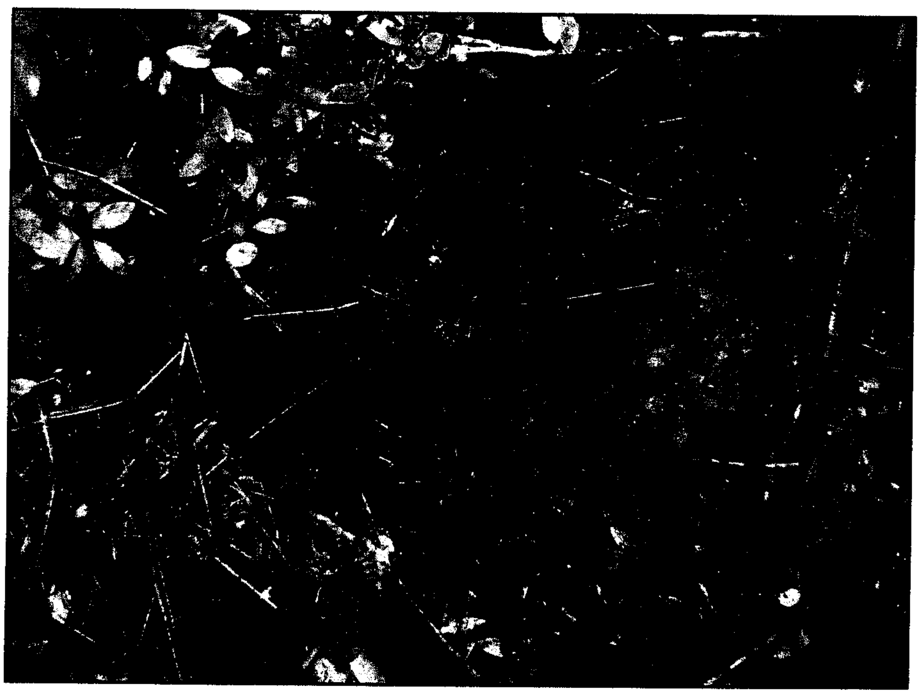
SP7



Vegetation



Soil Profile

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site:	Bayboro Wetland Restoration Site	Date:	11/12/2009
Applicant/Owner:	EBX	County:	Horry
Investigator:	Jens Geratz/Jeremy Schmid	State:	SC
Do Normal Circumstances exist on the site?	☒Yes ☐No	Community ID:	
Is the site significantly disturbed (Atypical Situation)?	☐Yes ☒No	Transect ID:	Wetland
Is the area a potential Problem Area? (If needed, explain on reverse.)	☐Yes ☒No	Plot ID:	SP08

VEGETATION

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
1. *Pinus taeda*	C	FAC	9.		
2. *Persea palustris*	S	FACW	10.		
3. *Acer rubrum*	S	FAC	11.		
4. *Clethra alnifolia*	S	FACW	12.		
5. *Nyssa biflora*	S	OBL	13.		
6. *Quercus phellos*	S	FACW-	14.		
7.			15.		
8.			16.		

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-). 100

Remarks: Pine Plantation

HYDROLOGY

☐ Recorded Data (Describe in Remarks):
- ☐ Stream, Lake, or Tide Gauge
- ☐ Aerial Photographs
- ☐ Other

☒ No Recorded Data Available

Field Observations:

Depth of Surface Water: 0 (in.)

Depth to Free Water in Pit: 10 (in.)

Depth to Saturated Soil: 8 (in.)

Wetland Hydrology Indicators:

Primary Indicators:
- ☐ Inundated
- ☒ Saturated in Upper 12 Inches
- ☐ Water Marks
- ☐ Drift Lines
- ☐ Sediment Deposits
- ☐ Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- ☐ Oxidized Root Channels in Upper 12 Inches
- ☐ Water-Stained Leaves
- ☐ Local Soil Survey Data
- ☒ FAC-Neutral Test
- ☐ Other (Explain in Remarks)

Remarks:

SOILS

Map Unit Name (Series and Phase):	Nansemond loamy find sand	Drainage Class:	Moderately well drained
Taxonomy (Subgroup):	*Aquic Hapludults*	Field Observations Confirm Mapped Type?	☐Yes ☒ No

Profile Descriptions:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/ Size/Contrast	Texture, Concretions, Structure, etc,
0-4		10YR 2/1			Sandy loam
4-7		10YR 3/2			Sandy loam
7-18		2.5Y 5/2			Sandy loam
18-24		2.5Y 5/4	10YR 7/2	50%	Sandy loam
24-30+		10YR 6/8	10YR 7/2	20%	Sand

Hydric Soil Indicators:

- ☐ Histosol
- ☐ Histic Epipedon
- ☐ Sulfidic Odor
- ☐ Aquic Moisture Regime
- ☐ Reducing Conditions
- ☐ Gleyed or Low-Chroma Colors
- ☐ Concretions
- ☐ High Organic Content in Surface Layer in Sandy Soils
- ☐ Organic Streaking in Sandy Soils
- ☐ Listed on Local Hydric Soils List
- ☐ Listed on National Hydric Soils List
- ☐ Other (Explain in Remarks)

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	☒Yes ☐No	(Check)	
Wetland Hydrology Present?	☒Yes ☐No		
Hydric Soils Present?	☐Yes ☒No		
		(Check)	
Is this Sampling Point Within a Wetland?	☐Yes ☒No		

Remarks

Approved by HQUSACE 3/92

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SP8

Vegetation

Soil Profile

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site:	Bayboro Wetland Restoration Site	Date:	11/12/2009
Applicant/Owner:	EBX	County:	Horry
Investigator:	Jens Geratz/Jeremy Schmid	State:	SC
Do Normal Circumstances exist on the site?	☒Yes ☐No	Community ID:	
Is the site significantly disturbed (Atypical Situation)?	☐Yes ☒No	Transect ID:	Wetland
Is the area a potential Problem Area? (If needed, explain on reverse.)	☐Yes ☒No	Plot ID:	SP09

VEGETATION

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
1. *Pinus taeda*	C	FAC	9.		
2. *Cyrilla racemiflora*	S	FACW	10.		
3. *Nyssa biflora*	S	OBL	11.		
4. *Ilex glabra*	S	FACW	12.		
5. *Lyonia lucida*	S	FACW	13.		
6. *Persea palustris*	S	FACW	14.		
7. *Smilax laurifolia*	V	FACW+	15.		
8.			16.		

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-). 100

Remarks: Pine Plantation

HYDROLOGY

☐ Recorded Data (Describe in Remarks):
- ☐ Stream, Lake, or Tide Gauge
- ☐ Aerial Photographs
- ☐ Other

☒ No Recorded Data Available

Field Observations:

Depth of Surface Water: 0 (in.)

Depth to Free Water in Pit: 0 (in.)

Depth to Saturated Soil: 0 (in.)

Wetland Hydrology Indicators:

Primary Indicators:
- ☐ Inundated
- ☒ Saturated in Upper 12 Inches
- ☐ Water Marks
- ☐ Drift Lines
- ☐ Sediment Deposits
- ☐ Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- ☒ Oxidized Root Channels in Upper 12 Inches
- ☐ Water-Stained Leaves
- ☒ Local Soil Survey Data
- ☒ FAC-Neutral Test
- ☐ Other (Explain in Remarks)

Remarks:

SOILS

Map Unit Name (Series and Phase):	Pocomoke fine sandy loam	Drainage Class:	Very poorly drained
		Field Observations	
Taxonomy (Subgroup):	*Typic Umbraqualts*	Confirm Mapped Type?	☐ Yes ☒ No

Profile Descriptions:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/ Size/Contrast	Texture, Concretions, Structure, etc,
0-8		10YR 2/1			Loam
8-24+		10YR 4/1			Clay

Hydric Soil Indicators:

- ☐ Histosol
- ☐ Histic Epipedon
- ☐ Sulfidic Odor
- ☐ Aquic Moisture Regime
- ☐ Reducing Conditions
- ☒ Gleyed or Low-Chroma Colors
- ☐ Concretions
- ☐ High Organic Content in Surface Layer in Sandy Soils
- ☐ Organic Streaking in Sandy Soils
- ☐ Listed on Local Hydric Soils List
- ☐ Listed on National Hydric Soils List
- ☐ Other (Explain in Remarks)

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	☒ Yes ☐ No (Check)		(Check)
Wetland Hydrology Present?	☒ Yes ☐ No		
Hydric Soils Present?	☒ Yes ☐ No	Is this Sampling Point Within a Wetland?	☒ Yes ☐ No

Remarks

Approved by HQUSACE 3/92

Forms version 1/02

SP9

Vegetation

Soil Profile

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: Bayboro Wetland Restoration Site	Date: 11/12/2009
Applicant/Owner: EBX	County: Horry
Investigator: Jens Geratz/Jeremy Schmid	State: SC
Do Normal Circumstances exist on the site? ☒Yes ☐No	Community ID:
Is the site significantly disturbed (Atypical Situation)? ☐Yes ☒No	Transect ID: Wetland
Is the area a potential Problem Area? ☐Yes ☒No (If needed, explain on reverse.)	Plot ID: SP10

VEGETATION

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
1. *Pinus taeda*	C	FAC	9. *Quercus phellos*	S	FACW-
2. *Ilex glabra*	S	FACW	10. *Morella cerifera*	S	FAC+
3. *Clethra alnifolia*	S	FACW	11. *Ilex decidua*	S	FACW-
4. *Liquidambar styraciflua*	S	FAC+	12.		
5. *Acer rubrum*	S	FAC	13.		
6. *Nyssa biflora*	S	OBL	14.		
7. *Gaylussacia frondosa*	S	FAC	15.		
8. *Magnolia virginiana*	S	FACW+	16.		

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-). 100

Remarks: Pine Plantation

HYDROLOGY

☐ Recorded Data (Describe in Remarks):
- ☐ Stream, Lake, or Tide Gauge
- ☐ Aerial Photographs
- ☐ Other

☒ No Recorded Data Available

Field Observations:

Depth of Surface Water: 0 (in.)

Depth to Free Water in Pit: 0 (in.)

Depth to Saturated Soil: 0 (in.)

Wetland Hydrology Indicators:

Primary Indicators:
- ☐ Inundated
- ☒ Saturated in Upper 12 Inches
- ☐ Water Marks
- ☐ Drift Lines
- ☐ Sediment Deposits
- ☐ Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- ☐ Oxidized Root Channels in Upper 12 Inches
- ☐ Water-Stained Leaves
- ☐ Local Soil Survey Data
- ☒ FAC-Neutral Test
- ☐ Other (Explain in Remarks)

Remarks:

SOILS

Map Unit Name (Series and Phase):	Nansemond loamy find sand	Drainage Class:	Moderately well drained
Taxonomy (Subgroup):	*Aquic Hapludults*	Field Observations Confirm Mapped Type?	☐Yes ☒ No

Profile Descriptions:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/ Size/Contrast	Texture, Concretions, Structure, etc,
0-4		10YR 2/1			Loam
4-7		10YR 3/1			Loam
7-12		10YR 4/1			Sandy loam
12-16		10YR 6/2			Sandy loam
24-30+		10YR 6/6			Sand

Hydric Soil Indicators:

- ☐ Histosol
- ☐ Histic Epipedon
- ☐ Sulfidic Odor
- ☐ Aquic Moisture Regime
- ☐ Reducing Conditions
- ☒ Gleyed or Low-Chroma Colors
- ☐ Concretions
- ☐ High Organic Content in Surface Layer in Sandy Soils
- ☐ Organic Streaking in Sandy Soils
- ☐ Listed on Local Hydric Soils List
- ☐ Listed on National Hydric Soils List
- ☐ Other (Explain in Remarks)

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	☒Yes ☐No (Check)		(Check)
Wetland Hydrology Present?	☒Yes ☐No		
Hydric Soils Present?	☒Yes ☐No	Is this Sampling Point Within a Wetland?	☒Yes ☐No

Remarks

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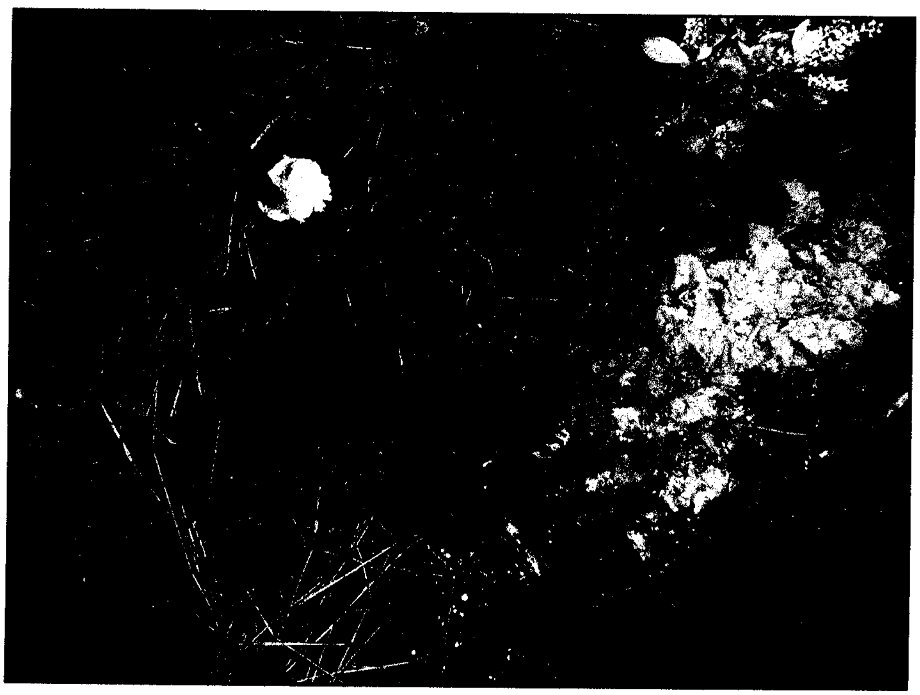
SP10

Vegetation



Soil Profile

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site:	Bayboro Wetland Restoration Site	Date:	11/12/2009
Applicant/Owner:	EBX	County:	Horry
Investigator:	Jens Geratz/Jeremy Schmid	State:	SC
Do Normal Circumstances exist on the site?	☒Yes ☐No	Community ID:	
Is the site significantly disturbed (Atypical Situation)?	☐Yes ☒No	Transect ID:	Wetland
Is the area a potential Problem Area? (If needed, explain on reverse.)	☐Yes ☒No	Plot ID:	SP11

VEGETATION

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
1. *Pinus taeda*	C	FAC	9.		
2. *Ilex glabra*	S	FACW	10.		
3. *Ilex decidua*	S	FACW-	11.		
4. *Nyssa biflora*	S	OBL	12.		
5. *Acer rubrum*	S	FAC	13.		
6. *Smilax laurifolia*	V	FACW+	14.		
7.			15.		
8.			16.		

Percent of Dominant Species that are OBL, FACW or FAC
(excluding FAC-). 100

Remarks: Pine Plantation

HYDROLOGY

☐ Recorded Data (Describe in Remarks):
- ☐ Stream, Lake, or Tide Gauge
- ☐ Aerial Photographs
- ☐ Other

☒ No Recorded Data Available

Field Observations:

Depth of Surface Water: 0 (in.)

Depth to Free Water in Pit: 0 (in.)

Depth to Saturated Soil: 0 (in.)

Wetland Hydrology Indicators:

Primary Indicators:
- ☐ Inundated
- ☒ Saturated in Upper 12 Inches
- ☐ Water Marks
- ☐ Drift Lines
- ☐ Sediment Deposits
- ☐ Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- ☐ Oxidized Root Channels in Upper 12 Inches
- ☐ Water-Stained Leaves
- ☐ Local Soil Survey Data
- ☒ FAC-Neutral Test
- ☐ Other (Explain in Remarks)

Remarks:

SOILS

Map Unit Name (Series and Phase): Nansemond loamy find sand

Drainage Class: Moderately well drained

Field Observations

Taxonomy (Subgroup): *Aquic Hapludults*

Confirm Mapped Type? ☐ Yes ☒ No

Profile Descriptions:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/ Size/Contrast	Texture, Concretions, Structure, etc,
0-3		10YR 2/1			Loam
3-12		10YR 4/1			Loam sand
12-24+		10YR 6/2			Sand

Hydric Soil Indicators:

- ☐ Histosol
- ☐ Histic Epipedon
- ☐ Sulfidic Odor
- ☐ Aquic Moisture Regime
- ☐ Reducing Conditions
- ☒ Gleyed or Low-Chroma Colors
- ☐ Concretions
- ☐ High Organic Content in Surface Layer in Sandy Soils
- ☐ Organic Streaking in Sandy Soils
- ☐ Listed on Local Hydric Soils List
- ☐ Listed on National Hydric Soils List
- ☐ Other (Explain in Remarks)

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present? ☒ Yes ☐ No (Check)

Wetland Hydrology Present? ☒ Yes ☐ No

Hydric Soils Present? ☒ Yes ☐ No

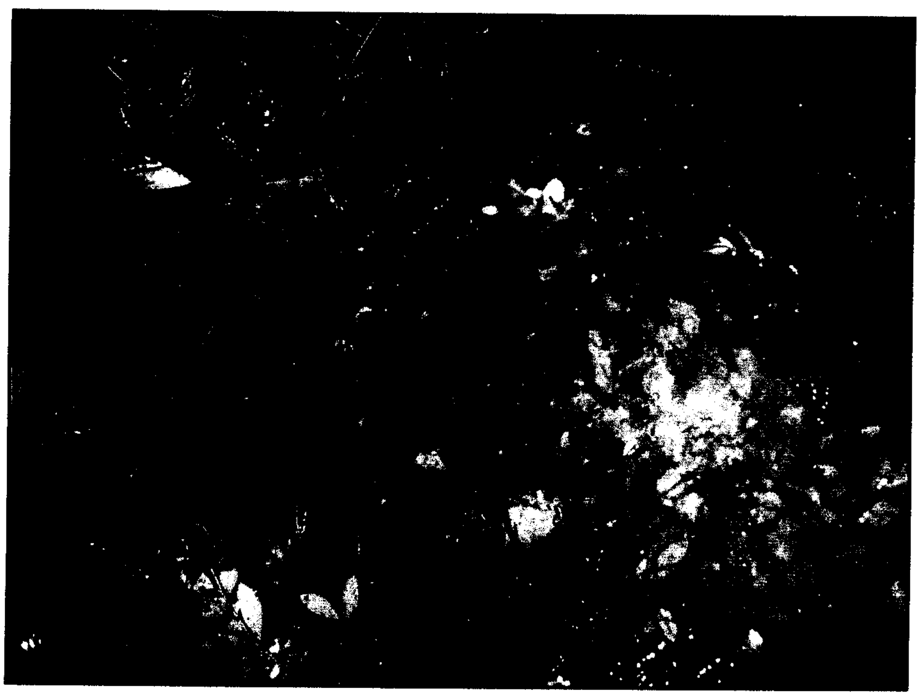
(Check)

Is this Sampling Point Within a Wetland? ☒ Yes ☐ No

Remarks

SP11

Vegetation



Soil Profile

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site:	Bayboro Wetland Restoration Site	Date:	11/12/2009
Applicant/Owner:	EBX	County:	Horry
Investigator:	Jens Geratz/Jeremy Schmid	State:	SC

Do Normal Circumstances exist on the site?	☒Yes	☐No	Community ID:	
Is the site significantly disturbed (Atypical Situation)?	☐Yes	☒No	Transect ID:	Wetland
Is the area a potential Problem Area? (If needed, explain on reverse.)	☐Yes	☒No	Plot ID:	SP12

VEGETATION

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
1. *Pinus taeda*	C	FAC	9.		
2. *Ilex decidua*	S	FACW-	10.		
3. *Cyrilla racemiflora*	S	FACW	11.		
4. *Ilex coriacea*	S	FACW	12.		
5. *Gaylussacia frondosa*	S	FAC	13.		
6. *Lyonia lucida*	S	FACW	14.		
7.			15.		
8.			16.		

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-). 100

Remarks: Pine Plantation

HYDROLOGY

☐ Recorded Data (Describe in Remarks):
- ☐ Stream, Lake, or Tide Gauge
- ☐ Aerial Photographs
- ☐ Other

☒ No Recorded Data Available

Field Observations:

Depth of Surface Water: 0 (in.)

Depth to Free Water in Pit: 0 (in.)

Depth to Saturated Soil: 0 (in.)

Wetland Hydrology Indicators:

Primary Indicators:
- ☐ Inundated
- ☒ Saturated in Upper 12 Inches
- ☐ Water Marks
- ☐ Drift Lines
- ☐ Sediment Deposits
- ☐ Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- ☒ Oxidized Root Channels in Upper 12 Inches
- ☐ Water-Stained Leaves
- ☒ Local Soil Survey Data
- ☒ FAC-Neutral Test
- ☐ Other (Explain in Remarks)

Remarks:

SOILS

Map Unit Name (Series and Phase):	Pocomoke fine sandy loam	Drainage Class:	Very poorly drained
		Field Observations	
Taxonomy (Subgroup):	*Typic Umbraqualts*	Confirm Mapped Type?	☐ Yes ☒ No

Profile Descriptions:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/ Size/Contrast	Texture, Concretions, Structure, etc,
0-8		10YR 2/1			Sandy loam
8-11		10YR 3/1			Sandy loam
11-14		10YR 4/1			Sandy loam
14-24+		10YR 6/2	10Y 5/6	5%, few faint	Sand

Hydric Soil Indicators:

- ☐ Histosol
- ☐ Histic Epipedon
- ☐ Sulfidic Odor
- ☐ Aquic Moisture Regime
- ☐ Reducing Conditions
- ☒ Gleyed or Low-Chroma Colors
- ☐ Concretions
- ☐ High Organic Content in Surface Layer in Sandy Soils
- ☐ Organic Streaking in Sandy Soils
- ☐ Listed on Local Hydric Soils List
- ☐ Listed on National Hydric Soils List
- ☐ Other (Explain in Remarks)

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	☒ Yes ☐ No (Check)		(Check)
Wetland Hydrology Present?	☒ Yes ☐ No		
Hydric Soils Present?	☒ Yes ☐ No	Is this Sampling Point Within a Wetland?	☒ Yes ☐ No

Remarks

SP12

Vegetation

Soil Profile

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site:	Bayboro Wetland Restoration Site	Date:	11/12/2009
Applicant/Owner:	EBX	County:	Horry
Investigator:	Jens Geratz/Jeremy Schmid	State:	SC
Do Normal Circumstances exist on the site?	☒Yes ☐No	Community ID:	
Is the site significantly disturbed (Atypical Situation)?	☐Yes ☒No	Transect ID:	Wetland
Is the area a potential Problem Area? (If needed, explain on reverse.)	☐Yes ☒No	Plot ID:	SP13

VEGETATION

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
1. *Pinus taeda*	C	FAC	9. *Clethra alnifolia*	S	FACW
2. *Lyonia lucida*	S	FACW	10. *Pteridium aquilinum*	H	FACU
3. *Gaylussacia frondosa*	S	FAC	11.		
4. *Magnolia virginiana*	S	FACW+	12.		
5. *Ilex glabra*	S	FACW	13.		
6. *Nyssa biflora*	S	OBL	14.		
7. *Persea palustris*	S	FACW	15.		
8. *Ilex decidua*	S	FACW-	16.		

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-). 100

Remarks: Pine Plantation

HYDROLOGY

☐ Recorded Data (Describe in Remarks):
- ☐ Stream, Lake, or Tide Gauge
- ☐ Aerial Photographs
- ☐ Other

☒ No Recorded Data Available

Field Observations:

Depth of Surface Water: 0 (in.)

Depth to Free Water in Pit: 1 (in.)

Depth to Saturated Soil: 0 (in.)

Wetland Hydrology Indicators:

Primary Indicators:
- ☐ Inundated
- ☒ Saturated in Upper 12 Inches
- ☐ Water Marks
- ☐ Drift Lines
- ☐ Sediment Deposits
- ☐ Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- ☐ Oxidized Root Channels in Upper 12 Inches
- ☐ Water-Stained Leaves
- ☐ Local Soil Survey Data
- ☒ FAC-Neutral Test
- ☐ Other (Explain in Remarks)

Remarks:

SOILS

Map Unit Name (Series and Phase):	Pocomoke fine sandy loam	Drainage Class:	Very poorly drained
		Field Observations	
Taxonomy (Subgroup):	*Typic Umbraqualts*	Confirm Mapped Type?	☐ Yes ☒ No

Profile Descriptions:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/ Size/Contrast	Texture, Concretions, Structure, etc,
0-2		10YR 2/1			Loam
2-7		10YR 4/1			Sandy loam
7-12		10YR 3/1			Sandy loam
12-16		10YR 4/1			Sandy loam
16-24+		10YR 7/1	10Y 6/6	40%	Sandy loam

Hydric Soil Indicators:

- ☐ Histosol
- ☐ Histic Epipedon
- ☐ Sulfidic Odor
- ☐ Aquic Moisture Regime
- ☐ Reducing Conditions
- ☒ Gleyed or Low-Chroma Colors
- ☐ Concretions
- ☐ High Organic Content in Surface Layer in Sandy Soils
- ☐ Organic Streaking in Sandy Soils
- ☐ Listed on Local Hydric Soils List
- ☐ Listed on National Hydric Soils List
- ☐ Other (Explain in Remarks)

Remarks:

WETLAND DETERMINATION

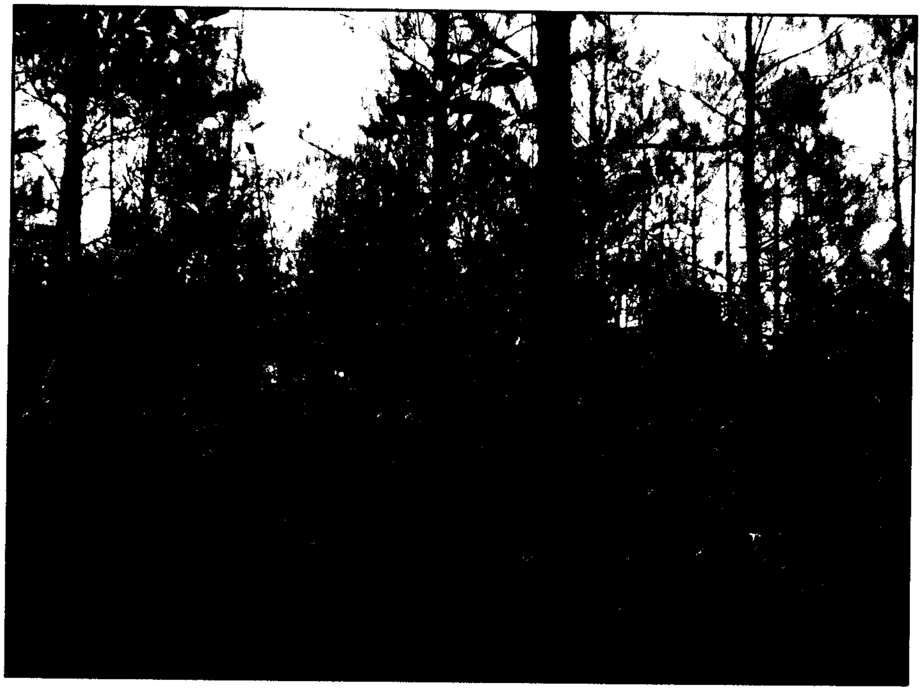
Hydrophytic Vegetation Present?	☒ Yes ☐ No	(Check)
Wetland Hydrology Present?	☒ Yes ☐ No	
Hydric Soils Present?	☒ Yes ☐ No	

Is this Sampling Point Within a Wetland? (Check) ☒ Yes ☐ No

Remarks

Approved by HQUSACE 3/92
Forms version 1/02

SP13



Vegetation

Soil Profile

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site:	Bayboro Wetland Restoration Site	Date:	11/12/2009
Applicant/Owner:	EBX	County:	Horry
Investigator:	Jens Geratz/Jeremy Schmid	State:	SC
Do Normal Circumstances exist on the site?	☒Yes ☐No	Community ID:	
Is the site significantly disturbed (Atypical Situation)?	☐Yes ☒No	Transect ID:	Wetland
Is the area a potential Problem Area? (If needed, explain on reverse.)	☐Yes ☒No	Plot ID:	SP14

VEGETATION

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
1. *Pinus taeda*	C	FAC	9.		
2. *Ilex glabra*	S	FACW	10.		
3. *Nyssa biflora*	S	OBL	11.		
4. *Morella cerifera*	S	FAC+	12.		
5. *Liquidambar styraciflua*	S	FAC+	13.		
6. *Symplocus tinctoria*	S	FAC	14.		
7. *Pteridium aquilinum*	H	FACU	15.		
8.			16.		

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-). 100

Remarks: Pine Plantation

HYDROLOGY

☐ Recorded Data (Describe in Remarks):
- ☐ Stream, Lake, or Tide Gauge
- ☐ Aerial Photographs
- ☐ Other

☒ No Recorded Data Available

Field Observations:

Depth of Surface Water: 0 (in.)

Depth to Free Water in Pit: 8 (in.)

Depth to Saturated Soil: 6 (in.)

Wetland Hydrology Indicators:

Primary Indicators:
- ☐ Inundated
- ☒ Saturated in Upper 12 Inches
- ☐ Water Marks
- ☐ Drift Lines
- ☐ Sediment Deposits
- ☐ Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- ☐ Oxidized Root Channels in Upper 12 Inches
- ☐ Water-Stained Leaves
- ☐ Local Soil Survey Data
- ☒ FAC-Neutral Test
- ☐ Other (Explain in Remarks)

Remarks:

SOILS

Map Unit Name (Series and Phase): Nansemond loamy find sand

Drainage Class: Moderately well drained

Taxonomy (Subgroup): *Aquic Hapludults*

Field Observations Confirm Mapped Type? ☐ Yes ☒ No

Profile Descriptions:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/ Size/Contrast	Texture, Concretions, Structure, etc,
0-3		10YR 2/1			Loam
3-6		10YR 3/1			Loam
6-24+		2.5Y 5/3			Sandy loam

Hydric Soil Indicators:

- ☐ Histosol
- ☐ Histic Epipedon
- ☐ Sulfidic Odor
- ☐ Aquic Moisture Regime
- ☐ Reducing Conditions
- ☐ Gleyed or Low-Chroma Colors
- ☐ Concretions
- ☐ High Organic Content in Surface Layer in Sandy Soils
- ☐ Organic Streaking in Sandy Soils
- ☐ Listed on Local Hydric Soils List
- ☐ Listed on National Hydric Soils List
- ☐ Other (Explain in Remarks)

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present? ☒ Yes ☐ No (Check)

Wetland Hydrology Present? ☒ Yes ☐ No

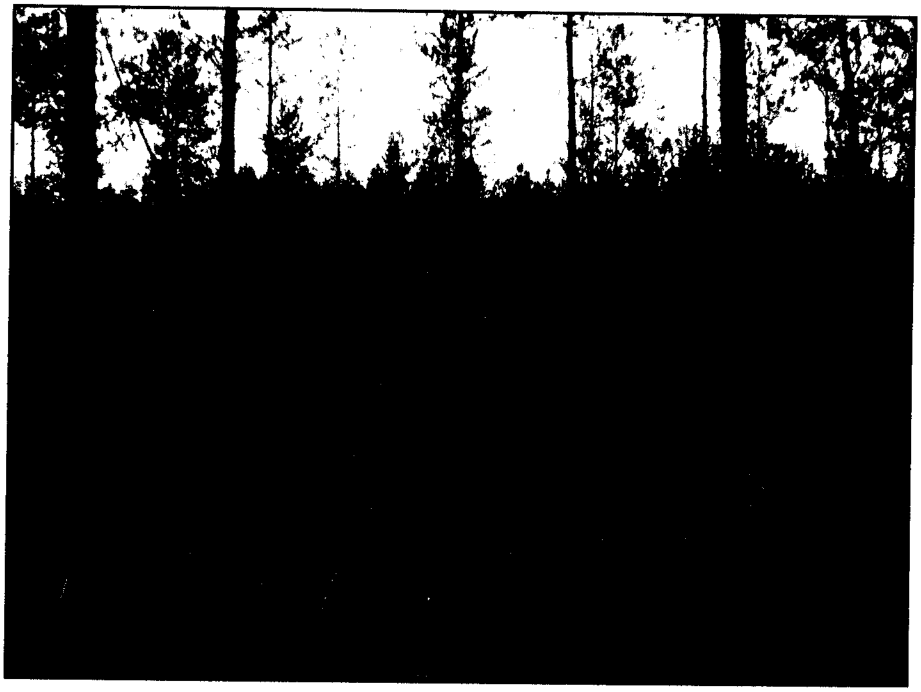
Hydric Soils Present? ☐ Yes ☒ No

(Check)

Is this Sampling Point Within a Wetland? ☐ Yes ☒ No

Remarks

SP14



Vegetation

Soil Profile

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site:	Bayboro Wetland Restoration Site	Date:	11/12/2009
Applicant/Owner:	EBX	County:	Horry
Investigator:	Jens Geratz/Jeremy Schmid	State:	SC
Do Normal Circumstances exist on the site?	☒Yes ☐No	Community ID:	
Is the site significantly disturbed (Atypical Situation)?	☐Yes ☒No	Transect ID:	Wetland
Is the area a potential Problem Area? (If needed, explain on reverse.)	☐Yes ☒No	Plot ID:	SP15

VEGETATION

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
1. *Pinus taeda*	C	FAC	9.		
2. *Smilax laurifolia*	S	FACW+	10.		
3. *Persea palustris*	S	FACW	11.		
4. *Cyrilla racemiflora*	S	FACW	12.		
5. *Clethra alnifolia*	S	FACW	13.		
6. *Andropogon virginicus*	H	FAC-	14.		
7.			15.		
8.			16.		

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-). 83

Remarks: Pine Plantation

HYDROLOGY

☐ Recorded Data (Describe in Remarks):
- ☐ Stream, Lake, or Tide Gauge
- ☐ Aerial Photographs
- ☐ Other

☒ No Recorded Data Available

Field Observations:

Depth of Surface Water: 0 (in.)

Depth to Free Water in Pit: 0 (in.)

Depth to Saturated Soil: 0 (in.)

Wetland Hydrology Indicators:

Primary Indicators:
- ☐ Inundated
- ☒ Saturated in Upper 12 Inches
- ☐ Water Marks
- ☐ Drift Lines
- ☐ Sediment Deposits
- ☐ Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- ☒ Oxidized Root Channels in Upper 12 Inches
- ☐ Water-Stained Leaves
- ☒ Local Soil Survey Data
- ☒ FAC-Neutral Test
- ☐ Other (Explain in Remarks)

Remarks:

SOILS

Map Unit Name (Series and Phase):	Pocomoke fine sandy loam	Drainage Class:	Very poorly drained
		Field Observations	
Taxonomy (Subgroup):	*Typic Umbraqualts*	Confirm Mapped Type?	☐ Yes ☒ No

Profile Descriptions:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/ Size/Contrast	Texture, Concretions, Structure, etc,
0-3		10YR 2/1			Loam
3-5		10YR 3/1			Loam
5-16		10YR 4/1			Sandy clay loam
16-24+		10YR 4/1			Sand loam

Hydric Soil Indicators:

- ☐ Histosol
- ☐ Histic Epipedon
- ☐ Sulfidic Odor
- ☐ Aquic Moisture Regime
- ☐ Reducing Conditions
- ☒ Gleyed or Low-Chroma Colors
- ☐ Concretions
- ☐ High Organic Content in Surface Layer in Sandy Soils
- ☐ Organic Streaking in Sandy Soils
- ☐ Listed on Local Hydric Soils List
- ☐ Listed on National Hydric Soils List
- ☐ Other (Explain in Remarks)

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present? ☒ Yes ☐ No (Check)
Wetland Hydrology Present? ☒ Yes ☐ No
Hydric Soils Present? ☒ Yes ☐ No

(Check)
Is this Sampling Point Within a Wetland? ☒ Yes ☐ No

Remarks

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SP15

Vegetation

Soil Profile

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site:	Bayboro Wetland Restoration Site	Date:	11/12/2009
Applicant/Owner:	EBX	County:	Horry
Investigator:	Jens Geratz/Jeremy Schmid	State:	SC
Do Normal Circumstances exist on the site?	☒Yes ☐No	Community ID:	
Is the site significantly disturbed (Atypical Situation)?	☐Yes ☒No	Transect ID:	Wetland
Is the area a potential Problem Area? (If needed, explain on reverse.)	☐Yes ☒No	Plot ID:	SP16

VEGETATION

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
1. *Pinus taeda*	C	FAC	9. *Pteridium aquilinum*	H	FACU
2. *Ilex glabra*	S	FACW	10.		
3. *Acer rubrum*	S	FAC	11.		
4. *Magnolia virginiana*	S	FACW+	12.		
5. *Symplocus tinctoria*	S	FAC	13.		
6. *Persea palustris*	S	FACW	14.		
7. *Andropogon virginicus*	H	FAC-	15.		
8. *Aristida stricta*	H	FAC-	16.		

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-). 67

Remarks: Pine Plantation

HYDROLOGY

☐ Recorded Data (Describe in Remarks):
- ☐ Stream, Lake, or Tide Gauge
- ☐ Aerial Photographs
- ☐ Other

☒ No Recorded Data Available

Field Observations:

Depth of Surface Water: 0 (in.)

Depth to Free Water in Pit: 0 (in.)

Depth to Saturated Soil: 0 (in.)

Wetland Hydrology Indicators:

Primary Indicators:
- ☐ Inundated
- ☒ Saturated in Upper 12 Inches
- ☐ Water Marks
- ☐ Drift Lines
- ☐ Sediment Deposits
- ☐ Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- ☒ Oxidized Root Channels in Upper 12 Inches
- ☐ Water-Stained Leaves
- ☒ Local Soil Survey Data
- ☒ FAC-Neutral Test
- ☐ Other (Explain in Remarks)

Remarks:

SOILS

Map Unit Name (Series and Phase):	Nansemond loamy find sand	Drainage Class:	Moderately well drained
Taxonomy (Subgroup):	*Aquic Hapludults*	Field Observations Confirm Mapped Type?	☐Yes ☒ No

Profile Descriptions:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/ Size/Contrast	Texture, Concretions, Structure, etc,
0-2		10YR 2/1			Loam
2-6		10YR 4/1			Loam
6-20		2.5Y 5/3	10YR 5/8	30%	Sandy loam
20-26+		10YR 4/1	10Y 6/2	20%	Sand

Hydric Soil Indicators:

- ☐ Histosol
- ☐ Histic Epipedon
- ☐ Sulfidic Odor
- ☐ Aquic Moisture Regime
- ☐ Reducing Conditions
- ☐ Gleyed or Low-Chroma Colors
- ☐ Concretions
- ☐ High Organic Content in Surface Layer in Sandy Soils
- ☐ Organic Streaking in Sandy Soils
- ☐ Listed on Local Hydric Soils List
- ☐ Listed on National Hydric Soils List
- ☐ Other (Explain in Remarks)

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	☒Yes ☐No (Check)		(Check)
Wetland Hydrology Present?	☒Yes ☐No		
Hydric Soils Present?	☐Yes ☒No	Is this Sampling Point Within a Wetland?	☐Yes ☒No

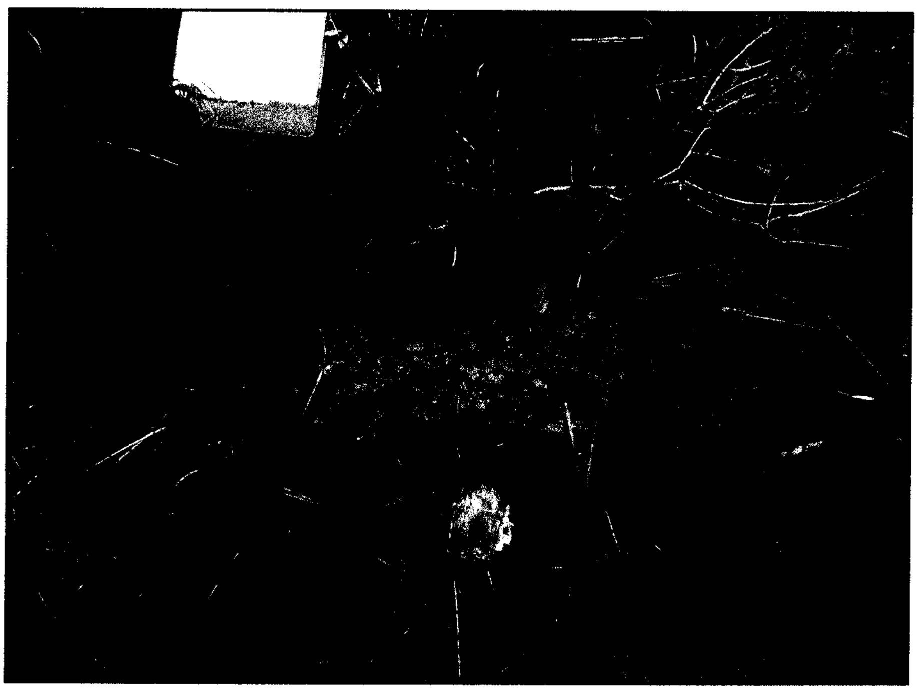
Remarks

Approved by HQUSACE 3/92

Forms version 1/02

SP16

Vegetation



Soil Profile

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site:	Bayboro Wetland Restoration Site	Date:	11/12/2009
Applicant/Owner:	EBX	County:	Horry
Investigator:	Jens Geratz/Jeremy Schmid	State:	SC
Do Normal Circumstances exist on the site?	☒Yes ☐No	Community ID:	
Is the site significantly disturbed (Atypical Situation)?	☐Yes ☒No	Transect ID:	Wetland
Is the area a potential Problem Area? (If needed, explain on reverse.)	☐Yes ☒No	Plot ID:	SP17

VEGETATION

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
1. *Pinus taeda*	C	FAC	9.		
2. *Symplocus tinctoria*	S	FAC	10.		
3. *Ilex glabra*	S	FACW	11.		
4. *Morella cerifera*	S	FAC+	12.		
5. *Pteridium aquilinum*	H	FACU	13.		
6.			14.		
7.			15.		
8.			16.		

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-). 100

Remarks: Pine Plantation

HYDROLOGY

☐ Recorded Data (Describe in Remarks):
- ☐ Stream, Lake, or Tide Gauge
- ☐ Aerial Photographs
- ☐ Other

☒ No Recorded Data Available

Field Observations:

Depth of Surface Water: 0 (in.)

Depth to Free Water in Pit: 13 (in.)

Depth to Saturated Soil: 12 (in.)

Wetland Hydrology Indicators:

Primary Indicators:
- ☐ Inundated
- ☒ Saturated in Upper 12 Inches
- ☐ Water Marks
- ☐ Drift Lines
- ☐ Sediment Deposits
- ☐ Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- ☐ Oxidized Root Channels in Upper 12 Inches
- ☐ Water-Stained Leaves
- ☒ Local Soil Survey Data
- ☒ FAC-Neutral Test
- ☐ Other (Explain in Remarks)

Remarks:

SOILS

Map Unit Name (Series and Phase):	Pocomoke fine sandy loam	Drainage Class:	Very poorly drained
		Field Observations	
Taxonomy (Subgroup):	*Typic Umbraqualts*	Confirm Mapped Type?	☐ Yes ☒ No

Profile Descriptions:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/ Size/Contrast	Texture, Concretions, Structure, etc,
0-2		10YR 2/1			Sandy loam
2-5		2.5Y 3/2			Sandy loam
5-8		2.5Y 4/3			Sandy loam
8-20		2.5Y 6/3	10YR 5/6	20%, faint	Loamy sand
20-24+		10YR 7/1	10YR 6/6	30%, prominent	Loamy sand

Hydric Soil Indicators:

- ☐ Histosol
- ☐ Histic Epipedon
- ☐ Sulfidic Odor
- ☐ Aquic Moisture Regime
- ☐ Reducing Conditions
- ☐ Gleyed or Low-Chroma Colors
- ☐ Concretions
- ☐ High Organic Content in Surface Layer in Sandy Soils
- ☐ Organic Streaking in Sandy Soils
- ☐ Listed on Local Hydric Soils List
- ☐ Listed on National Hydric Soils List
- ☐ Other (Explain in Remarks)

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	☒ Yes ☐ No	(Check)
Wetland Hydrology Present?	☒ Yes ☐ No	
Hydric Soils Present?	☐ Yes ☒ No	

(Check)

Is this Sampling Point Within a Wetland? ☐ Yes ☒ No

Remarks

Approved by HQUSACE 3/92

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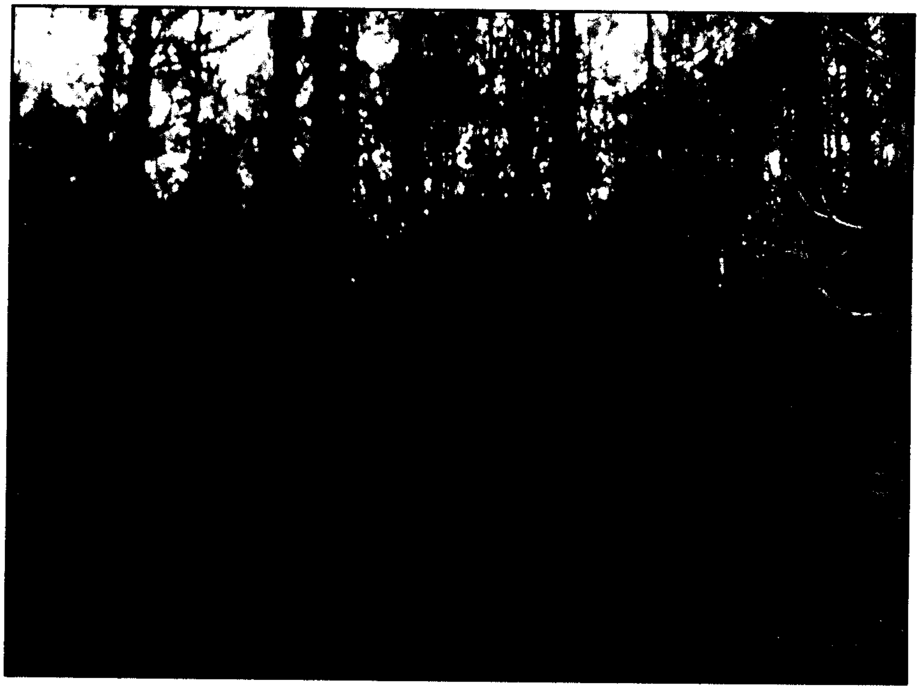
SP17



Vegetation

Soil Profile

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site:	Bayboro Wetland Restoration Site	Date:	11/12/2009
Applicant/Owner:	EBX	County:	Horry
Investigator:	Jens Geratz/Jeremy Schmid	State:	SC
Do Normal Circumstances exist on the site?	☒Yes ☐No	Community ID:	
Is the site significantly disturbed (Atypical Situation)?	☐Yes ☒No	Transect ID:	Wetland
Is the area a potential Problem Area? (If needed, explain on reverse.)	☐Yes ☒No	Plot ID:	SP18

VEGETATION

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
1. *Pinus taeda*	C	FAC	9.		
2. *Cyrilla racemiflora*	S	FACW	10.		
3. *Morella cerifera*	S	FAC+	11.		
4. *Acer rubrum*	S	FAC	12.		
5. *Persea palustris*	S	FACW	13.		
6.			14.		
7.			15.		
8.			16.		

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-). 100

Remarks: Pine Plantation

HYDROLOGY

☐ Recorded Data (Describe in Remarks):
- ☐ Stream, Lake, or Tide Gauge
- ☐ Aerial Photographs
- ☐ Other

☒ No Recorded Data Available

Field Observations:

Depth of Surface Water: 0 (in.)

Depth to Free Water in Pit: 0 (in.)

Depth to Saturated Soil: 0 (in.)

Wetland Hydrology Indicators:

Primary Indicators:
- ☐ Inundated
- ☒ Saturated in Upper 12 Inches
- ☐ Water Marks
- ☐ Drift Lines
- ☐ Sediment Deposits
- ☐ Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- ☐ Oxidized Root Channels in Upper 12 Inches
- ☐ Water-Stained Leaves
- ☒ Local Soil Survey Data
- ☒ FAC-Neutral Test
- ☐ Other (Explain in Remarks)

Remarks:

SOILS

Map Unit Name (Series and Phase):	Pocomoke fine sandy loam	Drainage Class:	Very poorly drained
		Field Observations	
Taxonomy (Subgroup):	*Typic Umbraqualts*	Confirm Mapped Type?	☐ Yes ☒ No

Profile Descriptions:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/ Size/Contrast	Texture, Concretions, Structure, etc,
0-10		10YR 2/1			Loam
10-16		10YR 3/1			Clay loam
16-36+		10YR 4/1			Silty clay

Hydric Soil Indicators:

- ☐ Histosol
- ☐ Histic Epipedon
- ☐ Sulfidic Odor
- ☐ Aquic Moisture Regime
- ☐ Reducing Conditions
- ☒ Gleyed or Low-Chroma Colors
- ☐ Concretions
- ☐ High Organic Content in Surface Layer in Sandy Soils
- ☐ Organic Streaking in Sandy Soils
- ☐ Listed on Local Hydric Soils List
- ☐ Listed on National Hydric Soils List
- ☐ Other (Explain in Remarks)

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	☒ Yes ☐ No	(Check)
Wetland Hydrology Present?	☒ Yes ☐ No	
Hydric Soils Present?	☒ Yes ☐ No	

(Check)

Is this Sampling Point Within a Wetland? ☒ Yes ☐ No

Remarks

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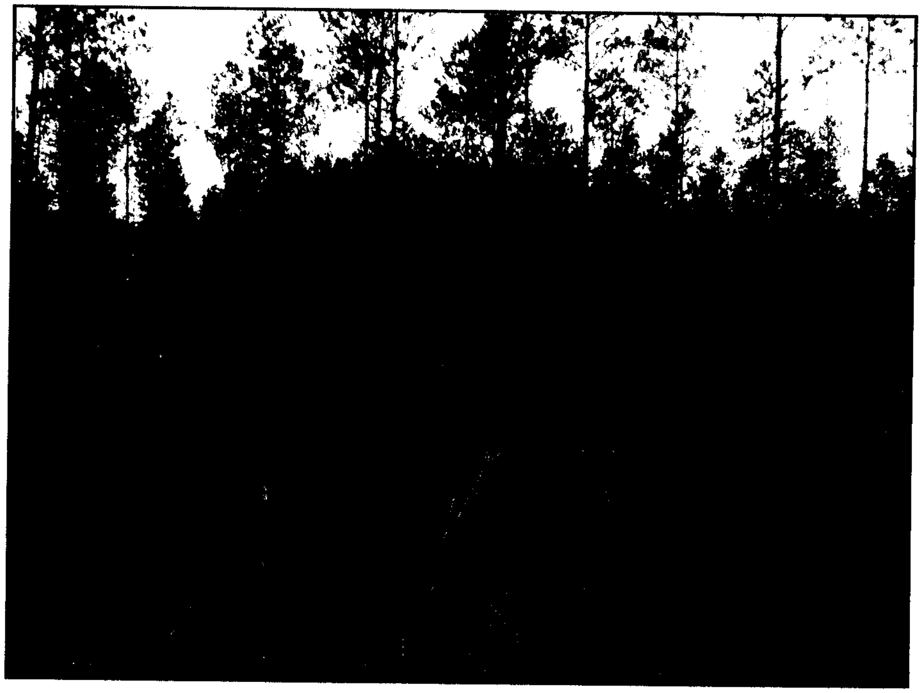
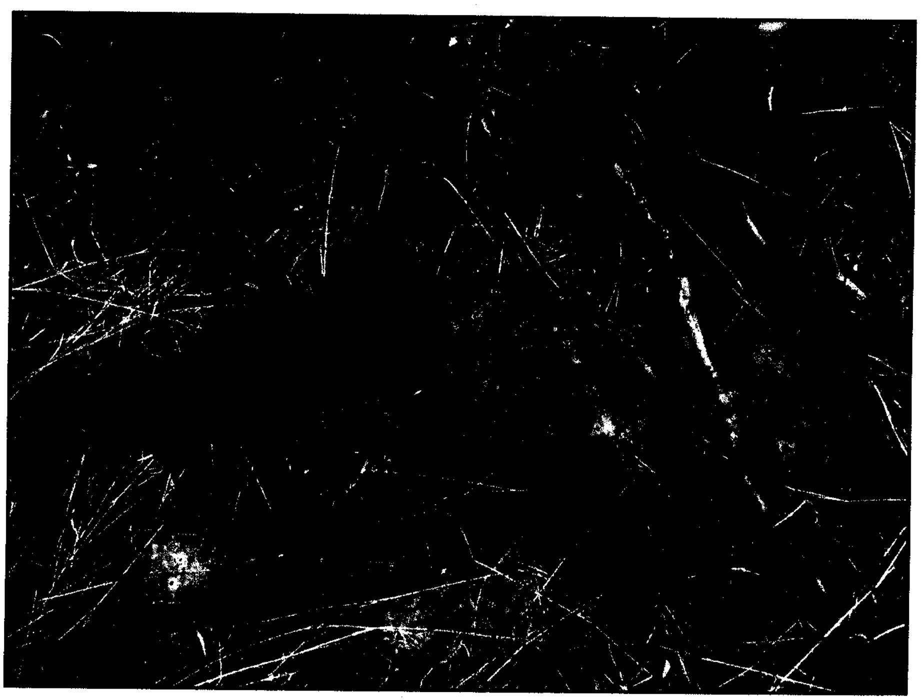
SP18



Vegetation



Soil Profile

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site:	Bayboro Wetland Restoration Site	Date:	11/12/2009
Applicant/Owner:	EBX	County:	Horry
Investigator:	Jens Geratz/Jeremy Schmid	State:	SC
Do Normal Circumstances exist on the site?	☒Yes ☐No	Community ID:	
Is the site significantly disturbed (Atypical Situation)?	☐Yes ☒No	Transect ID:	Wetland
Is the area a potential Problem Area? (If needed, explain on reverse.)	☐Yes ☒No	Plot ID:	SP19

VEGETATION

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
1. *Pinus taeda*	C	FAC	9.		
2. *Pteridium aquilinum*	H	FACU	10.		
3. *Kalmia angustifolia*	S	NI	11.		
4. *Persea palustris*	S	FACW	12.		
5. *Ilex glabra*	S	FACW	13.		
6. *Lyonia lucida*	S	FACW	14.		
7.			15.		
8.			16.		

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-). 80

Remarks: Pine Plantation

HYDROLOGY

☐ Recorded Data (Describe in Remarks):
- ☐ Stream, Lake, or Tide Gauge
- ☐ Aerial Photographs
- ☐ Other

☒ No Recorded Data Available

Field Observations:

Depth of Surface Water: 0 (in.)

Depth to Free Water in Pit: 12 (in.)

Depth to Saturated Soil: 10 (in.)

Wetland Hydrology Indicators:

Primary Indicators:
- ☐ Inundated
- ☒ Saturated in Upper 12 Inches
- ☐ Water Marks
- ☐ Drift Lines
- ☐ Sediment Deposits
- ☐ Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- ☐ Oxidized Root Channels in Upper 12 Inches
- ☐ Water-Stained Leaves
- ☐ Local Soil Survey Data
- ☒ FAC-Neutral Test
- ☐ Other (Explain in Remarks)

Remarks:

SOILS

Map Unit Name (Series and Phase):	Pocomoke fine sandy loam	Drainage Class:	Very poorly drained
		Field Observations	
Taxonomy (Subgroup):	*Typic Umbraqualts*	Confirm Mapped Type?	☐Yes ☒ No

Profile Descriptions:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/ Size/Contrast	Texture, Concretions, Structure, etc,
0-3		10YR 3/1			Sandy loam
3-5		10YR 3/3			Sandy loam
5-9		2.5Y 6/4			Sandy loam
9-18		2.5Y 6/4	10YR 5/6	10% faint	Sandy loam
18-24+		2.5Y6/4	10YR 5/8	30% prominent	Sandy loam

Hydric Soil Indicators:

- ☐ Histosol
- ☐ Histic Epipedon
- ☐ Sulfidic Odor
- ☐ Aquic Moisture Regime
- ☐ Reducing Conditions
- ☐ Gleyed or Low-Chroma Colors
- ☐ Concretions
- ☐ High Organic Content in Surface Layer in Sandy Soils
- ☐ Organic Streaking in Sandy Soils
- ☐ Listed on Local Hydric Soils List
- ☐ Listed on National Hydric Soils List
- ☐ Other (Explain in Remarks)

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	☒Yes ☐No (Check)	
Wetland Hydrology Present?	☒Yes ☐No	(Check)
Hydric Soils Present?	☐Yes ☒No	Is this Sampling Point Within a Wetland? ☐Yes ☒No

Remarks

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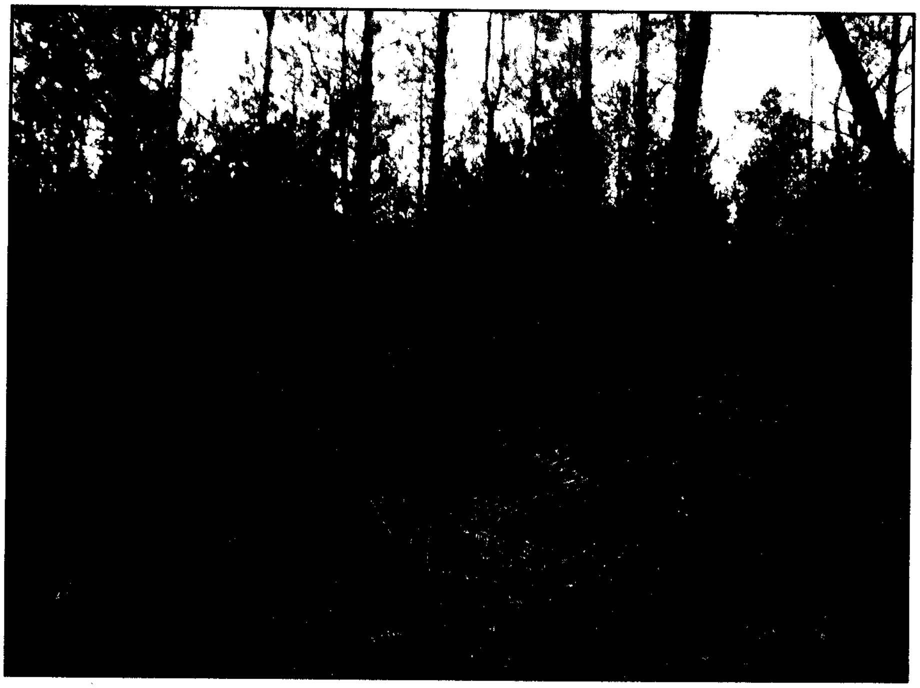
SP19



Vegetation

Soil Profile

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site:	Bayboro Wetland Restoration Site	Date:	11/13/2009
Applicant/Owner:	EBX	County:	Horry
Investigator:	Jens Geratz/Jeremy Schmid	State:	SC
Do Normal Circumstances exist on the site?	☒Yes ☐No	Community ID:	
Is the site significantly disturbed (Atypical Situation)?	☐Yes ☒No	Transect ID:	Wetland
Is the area a potential Problem Area? (If needed, explain on reverse.)	☐Yes ☒No	Plot ID:	SP20

VEGETATION

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
1. *Pinus taeda*	C	FAC	9. *Smilax laurifolia*	V	FACW+
2. *Persea palustris*	S	FACW	10.		
3. *Ilex glabra*	S	FACW	11.		
4. *Gaylussacia frondosa*	S	FAC	12.		
5. *Lyonia lucida*	S	FACW	13.		
6. *Symplocus tinctoria*	S	FAC	14.		
7. *Cyrilla racemiflora*	S	FACW	15.		
8. *Morella cerifera*	S	FAC+	16.		

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-). 100

Remarks: Pine Plantation

HYDROLOGY

☐ Recorded Data (Describe in Remarks):
- ☐ Stream, Lake, or Tide Gauge
- ☐ Aerial Photographs
- ☐ Other

☒ No Recorded Data Available

Field Observations:

Depth of Surface Water: 0 (in.)

Depth to Free Water in Pit: 7 (in.)

Depth to Saturated Soil: 5 (in.)

Wetland Hydrology Indicators:

Primary Indicators:
- ☐ Inundated
- ☒ Saturated in Upper 12 Inches
- ☐ Water Marks
- ☐ Drift Lines
- ☐ Sediment Deposits
- ☐ Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- ☐ Oxidized Root Channels in Upper 12 Inches
- ☐ Water-Stained Leaves
- ☐ Local Soil Survey Data
- ☒ FAC-Neutral Test
- ☐ Other (Explain in Remarks)

Remarks:

SOILS

Map Unit Name (Series and Phase):	Osier loamy sand	Drainage Class:	Poorly drained
		Field Observations	
Taxonomy (Subgroup):	*Typic Psammaquents*	Confirm Mapped Type?	☐Yes ☒ No

Profile Descriptions:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/ Size/Contrast	Texture, Concretions, Structure, etc,
0-2		10YR 2/1			Loam
2-7		10YR 4/1			Sandy loam
7-14		10YR 6/1	10YR 4/6	2%, prominent	Loamy sand
14-24+		10YR 6/1	10YR 6/6	20% prominent	Loamy sand

Hydric Soil Indicators:

- ☐ Histosol
- ☐ Histic Epipedon
- ☐ Sulfidic Odor
- ☐ Aquic Moisture Regime
- ☐ Reducing Conditions
- ☒ Gleyed or Low-Chroma Colors
- ☐ Concretions
- ☐ High Organic Content in Surface Layer in Sandy Soils
- ☐ Organic Streaking in Sandy Soils
- ☐ Listed on Local Hydric Soils List
- ☐ Listed on National Hydric Soils List
- ☐ Other (Explain in Remarks)

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	☒Yes ☐No (Check)		(Check)
Wetland Hydrology Present?	☒Yes ☐No		
Hydric Soils Present?	☒Yes ☐No	Is this Sampling Point Within a Wetland?	☒Yes ☐No

Remarks

Approved by HQUSACE 3/92

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SP20

Vegetation

Soil Profile

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site:	Bayboro Wetland Restoration Site	Date:	11/13/2009
Applicant/Owner:	EBX	County:	Horry
Investigator:	Jens Geratz/Jeremy Schmid	State:	SC
Do Normal Circumstances exist on the site?	☒Yes ☐No	Community ID:	
Is the site significantly disturbed (Atypical Situation)?	☐Yes ☒No	Transect ID:	Wetland
Is the area a potential Problem Area? (If needed, explain on reverse.)	☐Yes ☒No	Plot ID:	SP21

VEGETATION

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
1. *Pinus taeda*	C	FAC	9. *Ilex glabra*	S	FACW
2. *Gaylussacia frondosa*	S	FAC	10. *Smilax laurifolia*	V	FACW+
3. *Lyonia lucida*	S	FACW	11.		
4. *Acer rubrum*	S	FAC	12.		
5. *Persea palustris*	S	FACW	13.		
6. *Nyssa biflora*	S	OBL	14.		
7. *Morella cerifera*	S	FAC+	15.		
8. *Magnolia virginiana*	S	FACW+	16.		

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-). 100

Remarks: Pine Plantation

HYDROLOGY

☐ Recorded Data (Describe in Remarks):
- ☐ Stream, Lake, or Tide Gauge
- ☐ Aerial Photographs
- ☐ Other

☒ No Recorded Data Available

Field Observations:

Depth of Surface Water: 0 (in.)

Depth to Free Water in Pit: 0 (in.)

Depth to Saturated Soil: 0 (in.)

Wetland Hydrology Indicators:

Primary Indicators:
- ☐ Inundated
- ☒ Saturated in Upper 12 Inches
- ☐ Water Marks
- ☐ Drift Lines
- ☐ Sediment Deposits
- ☐ Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- ☐ Oxidized Root Channels in Upper 12 Inches
- ☐ Water-Stained Leaves
- ☒ Local Soil Survey Data
- ☒ FAC-Neutral Test
- ☐ Other (Explain in Remarks)

Remarks:

SOILS

Map Unit Name (Series and Phase):	Pocomoke fine sandy loam	Drainage Class:	Very poorly drained
		Field Observations	
Taxonomy (Subgroup):	*Typic Umbraqualts*	Confirm Mapped Type?	☐ Yes ☒ No

Profile Descriptions:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/ Size/Contrast	Texture, Concretions, Structure, etc,
0-4		10YR 2/1			Loam
4-7		10YR 3/1			Loam
7-12		10YR 4/1			Sandy clay loam
12-24+		10YR 5/1			Sandy loam

Hydric Soil Indicators:

- ☐ Histosol
- ☐ Histic Epipedon
- ☐ Sulfidic Odor
- ☐ Aquic Moisture Regime
- ☐ Reducing Conditions
- ☒ Gleyed or Low-Chroma Colors
- ☐ Concretions
- ☐ High Organic Content in Surface Layer in Sandy Soils
- ☐ Organic Streaking in Sandy Soils
- ☐ Listed on Local Hydric Soils List
- ☐ Listed on National Hydric Soils List
- ☐ Other (Explain in Remarks)

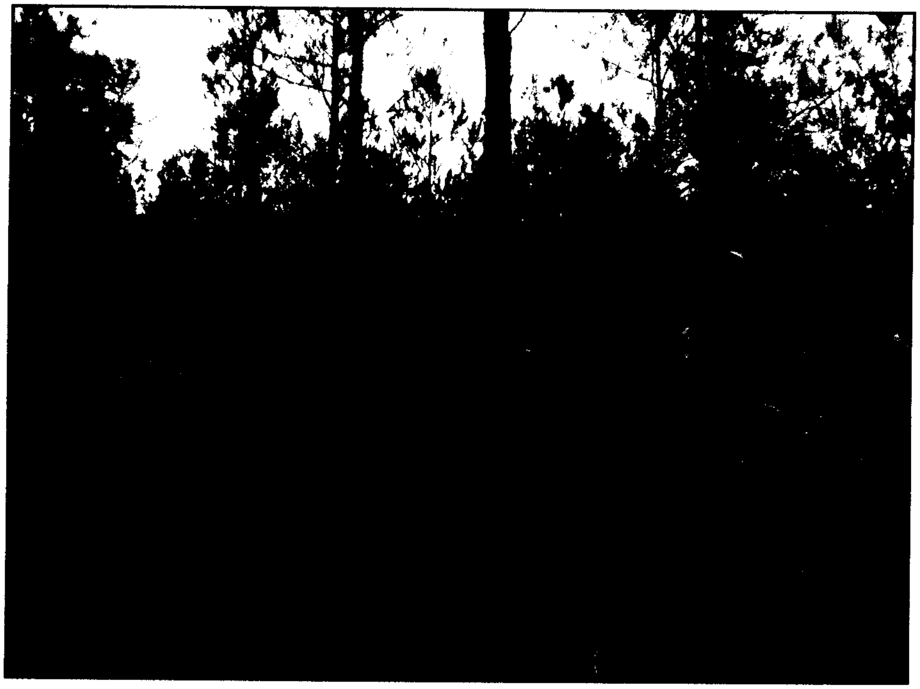
Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	☒ Yes ☐ No (Check)	(Check)
Wetland Hydrology Present?	☒ Yes ☐ No	
Hydric Soils Present?	☒ Yes ☐ No	Is this Sampling Point Within a Wetland? ☒ Yes ☐ No

Remarks

SP21

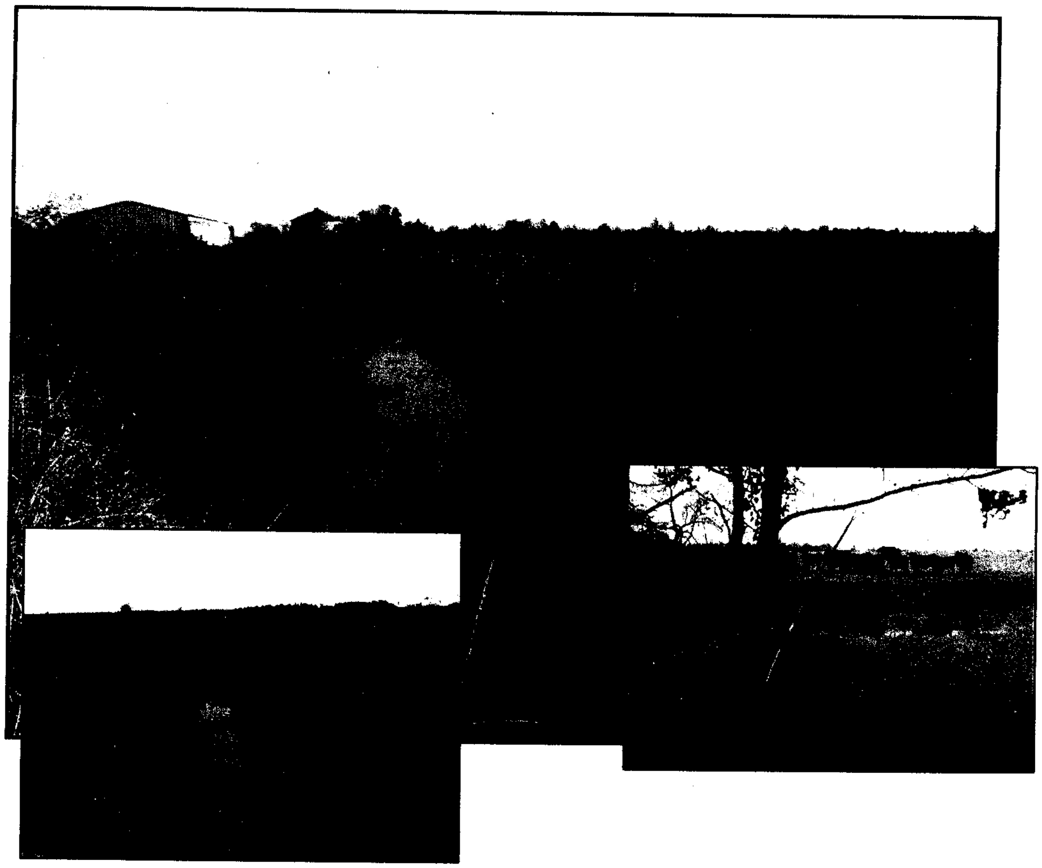


Vegetation

Soil Profile

Section 3: CONCEPTUAL MITIGATION PLAN
I-73
Alternate 1

Brittons Neck Mitigation Site
Marion County, South Carolina



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MITIGATION PLAN OVERVIEW

This technical proposal describes the proposed ecosystem restoration approach designed specifically to fulfill the SCDOT mitigation obligations for the proposed Interstate 73 (I-73), which requires 4,163 wetland credits and 18,220 stream credits.

The Conceptual Mitigation Plan includes two sites which, when combined with the remaining preservation credits from Sandy Island, address the I-73 mitigation needs. The first site is a landscape scale wetlands enhancement project with multiple wetland types matching the various impacted habitats by the I-73 corridor. This site is located two miles from the I-73 Preferred Corridor in West Horry County within the same watershed containing the majority of the wetland impacts. The second site is a coastal plain stream restoration site located in the watershed covering the northern section of the I-73 Preferred Corridor.

Mitigation Summary

Location	Wetlands Preservation credits	Wetlands Restoration credits	Wetland Mitigation Credits	Stream Buffer Credits	Stream Restoration Credits	Stream Mitigation Credits
Sandy Island Mitigation Bank	1,500					
Joiner Swamp Wetland Site		2,663				
Brittons Neck Stream Site				3,127	15,093	
Totals			4,163			18,220
Restoration Ratio			64%			83%
HUC	03040206	03040204		03040201	03040201	

- For details on the Joiner Swamp site see Section 2.0
- The Conceptual Mitigation Plan for the Brittons Neck site follows
- See the Sandy Island Mitigation Bank Instrument for details

3.1: OBJECTIVES OF THE PROJECT

3.1.1 Project Contacts

Environmental Banc & Exchange, LLC
Randy Wilgis, President
604 Greene St.
Camden, SC 29020
803-432-4890

3.1.2 Mitigation Credits

This technical proposal describes the proposed ecosystem restoration approach for the Brittons Neck Mitigation Site (Site) and is designed specifically to meet mitigation obligations of the 404 permit for the proposed Interstate 73 (I-73).

Proposed stream restoration activities on the Site will provide the approximately 4,249 linear feet of coastal plain stream restoration, enhancement of approximately 7.5 acres of stream buffer along 1,100 linear feet of stream, and the preservation of approximately 6.2 acres of bottomland hardwoods and wooded swamp buffer along 794 linear feet of stream, and preservation of 18.1 acres of associated stream buffers. Stream credit calculations using the United States Army Corps of Engineers (USACE) "Standard Operating Procedure" (RD-SOP-02-01) was used to calculate available site credits. Based on these calculations the project is estimated to yield approximately 18220 stream credits. A summary of the proposed amount of stream credit is present in the table below. The mitigation SOP worksheets outlining the scores are provided in Appendix A.

Mitigation Credit Estimation			
Credit Types	**Stream Credits**	**Linear Feet**	**Acres**
Coastal Plain Stream Restoration	15,508.9	4,249	--
Minimum Stream Buffer Restoration	--	--	18.1
Buffer Enhancement	1,787.5	1,100	7.5
Buffer Preservation	992.5	794	6.2
Credit Reservation	(68.9)	--	--
Total	**18,220.0**	**6,143**	**31.8**

3.1.3 Project Goals

The proposed Site will provide numerous water quality, hydrologic, ecological, and human derived benefits within the Pee-Dee River Basin. While some of the benefits may be limited to the project site or immediate vicinity, many benefits such as improved water quality, water storage, and ecological habitat improvements, will have far-reaching effects throughout the region. Expected site benefits and improvements are outlined below as project goals.

Benefits Related to Water Quality	
Nutrient removal	Benefit will be achieved through filtering of runoff through buffers and improved uptake of nutrients in the restored wetlands and within the buffer zone.
Sediment removal	Benefit will be achieved through the removal or stabilization of eroding channelized banks with coastal plain headwater stream and Priority 1 stream restoration methods, and from stabilization of adjacent farmland through buffer and wetland planting.
Increased dissolved oxygen concentration	Benefits will be achieved through shading of the stream from planted buffer restoration. The increased shade will decrease water temperatures and increase dissolved oxygen concentrations.
Benefits Related to Hydrology	
Surface storage and retention	Benefits will be achieved through increased retention times.
Subsurface water and retention	Benefits will be achieved by increasing the volume of water available to local aquifers through the increased residence time of local rainfall.
Benefits Related to Ecological Processes	
Restoration of terrestrial habitat	Benefits will be achieved through the restoration of physical structure and vegetation composition to adjacent buffer areas.
Restoration of aquatic habitat	Benefits will be achieved through the restoration of drainage pathways and antecedent hydrologic regime to both on-site and downstream watershed locations
Improved aesthetics	Benefits will be achieved through the restoration of riparian and buffer plant communities, removal of ditches, and the restoration of local wetlands and the stream network.
Equivalency to Mitigation Bank Standards	
Watershed approach	The scale of the project, location of the site, the likelihood of ecological success, and the hydrologic benefits to the watershed support the rational for restoration of this outstanding resource.
Planning	Rigorous scientific and technical analysis will be performed to support the approved Final Mitigation Plan

Monitoring requirements	The project will be subject to a five year monitoring period, with defined ecological performance monitoring benchmarks
Financial assurances	The combination of an upfront escrow fund to cover work activities with a long term endowment to fund ongoing easement monitoring and enforcement equivalent to that required of a mitigation bank.

3.2: TECHNICAL FEASIBILTY OF THE PROJECT SITE

3.2.1 Watershed Description

The Site is located in the community of Brittons Neck in Marion County, South Carolina, approximately 20 miles west of Conway (Figure 1, Appendix B). The Site is located in the Coastal Plain physiographic province of South Carolina within the United States Geological Survey (USGS) Hydrologic Cataloguing Unit (HUC) 03040201 of the Pee Dee River Basin (Figure 2, Appendix B). The Site is located within the Mid-Atlantic Floodplains and Low Terraces ecoregion of South Carolina (Griffith et al. 2002). This ecoregion is mostly a continuation of the adjacent riverine ecoregion Southeastern Floodplains and Low Terraces. Low gradient streams, deep-water swamps, and oxbow lakes are commonly found within the ecoregion. Streams within the Mid-Atlantic Floodplains and Low Terraces ecoregion are further characterized by sandy and silty substrate with brownwater or blackwater floodplains. Cypress-gum swamps and bottomland hardwood forests are common.

Local elevations range from 25 feet National Geodetic Vertical Datum (NGVD) within the floodplain of Maple Swamp to 30 feet NGVD at high points along US 378 (USGS Brittons Neck, South Carolina 7.5-minute topographic quadrangle) (Figure 3, Appendix B). Land-uses in the watershed is dominated by rural uses including large scale agriculture, pastureland, roadside shoulders, and residential lots, and paved and unpaved state roads with limited commercial development occurring in the vicinity of townships and communities. Historically, the Site has been primarily managed for cattle production with the majority of the property in pasture, with lesser areas planted with row crops. More recently, cattle production has been limited to a small portion of the watershed and significant areas adjacent to the planted with loblolly pine.

3.2.2 Site Selection Rationale

The Site is located in HUC 03040204 and is less than 15 miles from the proposed I-73 corridor. The Site presents an ideal opportunity to pursue landscape-scale, ecologically meaningful, stream and buffer restoration and buffer preservation. As described more fully below, the proposed restoration will result in approximately 4,249 linear feet of stream restoration, approximately 7.5 acres of buffer restoration, and 6.2 acres of wetland and stream buffer preservation. Restoration of these assets will provide significant ecological improvements through habitat restoration and decrease nutrient and sediment loads to downstream receiving waters.

The Site characteristics matches well to address the jurisdictional impacts of I-73. The conceptual mitigation plan includes restoration of similar stream systems and plant community ecosystems that are being impacted by the project. Finally, many of the stream impacts covered under the I-73 permit application occur in HU 03040201, which is the same watershed addressed by this conceptual mitigation plan.

Most importantly, the Brittons Neck region is a high conservation priority for the Pee Dee Land Trust and others due to the presence of the 25,668 acre Woodbury Wildlife Management Areas and Heritage Preserve owned by the South Carolina Department of Natural Resources (SCDNR). The Woodbury Tract is located just south of the Site at the confluence of the Pee Dee and Little Pee Dee Rivers. The Site includes a tributary of Maple Swamp, which feeds into the Woodbury Tract.

Finally, there exists the potential to integrate the work under this Mitigation Plan with a companion compensatory mitigation project, which would double the amount of overall stream restoration, and incorporate significant wetland restoration into one contiguous project. The staging of the various phases would depend on timing of the respective permits. In the event that this integrated project becomes feasible, a different alternative (Alternative 2) may be presented that equally generates the credits needed for the I-73 project. It is estimated the integrated site would incorporate over 178 acres under a perpetual conservation easement. The combined site would provide approximately 22.5 acres of restored and enhanced wetlands, approximately 6,225 linear feet of restored and enhanced streams, approximately 40.1 acres of buffer restoration or enhancement, approximately 12.7 acres of buffer preservation along 2570 feet of stream preservation, and approximately 85.3 acres of wetland preservation. This integrated restoration plan with Alternative 2 is shown on Figure 8.

3.3: SITE OWNERSHIP, FINANCIAL ASSURANCE AND LONG-TERM MANAGEMENT

3.3.1 Long-Term Management

To ensure long-term protection of the mitigation project, the entire Easement Area, (as shown in Figure 6, Appendix B) will be placed under a conservation easement in perpetuity as the first primary task following approval of the Final Mitigation Plan. The easement shall be equivalent to the conservation easement template provided on the Charleston District's website. The conservation easement will specify permissible activities such as hunting and other recreational uses under the restriction that the activity causes no negative effect on the functions and values of the restored wetlands. The conservation easement will also allow for ongoing beaver management within the mitigation site given that such an activity is performed to maintain or improve the overall ecological function of the site. The easement will be held by a 501(c)3 organization. The Pee Dee Land Trust has expressed an interest in holding the easement, pending further review and respective internal approval processes.

3.3.2 Long-Term Maintenance

The entities involved in long-term management, and their respective roles, will be defined a part of the Final Mitigation Plan. The obligation under the Final Mitigation Plan to address Long-Term Management will be the placement of the conservation easement on the Site with an easement holder acceptable to the USACE, and funding of the Long Term Endowment sufficient to cover the easement holder's cost to monitor, report on, and protect the easement.

3.3.3 Ownership

The Site is currently under the control of EBX through an easement purchase contract agreement. It is the intent of EBX to place a conservation easement on the Site, and perform all required work under Final Mitigation Plan. The easement will be held by a 501(c)3 conservation organization. The lands adjacent to the easement will continue to be used as they are currently, which includes maintenance and use of the duck impoundments, raising cattle, agriculture, and silviculture

3.3.4 Financial Assurances

The Financial Assurances to ensure successful implementation of the Final Mitigation Plan will have two components. To meet the equivalency requirement under the 2008 Federal Compensatory Mitigation Regulations, the Conceptual Mitigation Plan incorporates both Short-Term and Long-Term Financial Assurances, as defined below;

a. Short-Term Financial Assurance: A performance bond will be provided that covers the Final Mitigation Plan scope of work from Mobilization through submittal of the As-built Report; and

b. Long-Term Endowment: Prior to the end of Monitoring Year 3, a Long-Term Endowment will be established to cover easement monitoring, reporting, and enforcement specified in the Final Mitigation Plan and described in Section 4.2.

3.4: ECOLOGICAL SUITABILITY

3.4.1 Site Description

The Site comprises approximately 31.8 acres situated in the floodplain, low terrace and side slopes of Maple Swamp, a tributary to The Great Pee Dee River located approximately 2 miles to the south. The Site includes two unnamed tributaries (UT1 and UT2) that flow into Maple Swamp from the east (Figure 3, Appendix B). All streams and drainages on the Site have been degraded due to past channelization. Current land use of the Site consists of bottomland hardwood, upland woodland, agriculture (livestock and row crops), fallow fields, and waterfowl impoundments. For the purposes of this document, the Site will be discussed in two parts, a preservation area and a restoration area. The preservation area encompasses approximately 6.2 acres and includes buffer areas along the lower reach of UT1 (Figures 3 and 4, Appendix B).

The stream restoration area includes approximately 18 acres along 4,249 linear feet of UT1 and UT2. The presence of side cast material, incised conditions, and the lack of natural stream pattern indicate that streams were channelized and straightened to improve drainage for agricultural production in the area. Along the reaches targeted for restoration, bank erosion and run-off are contributing significant amounts of fine sediments and nutrients to downstream receiving waters. The lack of buffers along the active restoration reaches is likely contributing excess nutrients to the stream via runoff and subsurface drainage. Channel instability is widespread, most likely to past channelization and an overall lack of riparian vegetation.

3.4.2 Soils

On-site soils have been mapped by the NRCS (SCS 1990) and are depicted on Figure 5 (Appendix B). The Site contains hydric, partially hydric, and not hydric upland soils. Cantey loam is the sole hydric soils type (27.2 acres) located within the Site Centenary sand, Persanti fine sandy loam (0-2 percent slopes), and Tawcaw-Chastain Association are partially hydric (3.3 acres). Upland soils (1.3 acres) are represented as Persanti fine sandy loam (2-6 percent slopes). Anthropogenic activities including channel modifications (dredging, straightening, etc.) have resulted in disturbances and some alterations to soil hydrologic conditions. Landscape alterations associated with current land use practices, including rerouting of streams, have also resulted in the hydrologic alteration of on-site hydric soils. On-site hydric soil boundaries will be verified as part of a jurisdictional area determination and included in the Final Mitigation Plan.

3.4.3 Jurisdictional Wetlands

Jurisdictional areas are defined using the criteria set forth in the USACE Wetlands Delineation Manual (USACE 1987). Wetlands are defined by the presence of three criteria: hydrophytic vegetation, hydric soils, and evidence for wetland hydrology during the growing season (USACE 1987). Open water systems and wetlands receive similar treatment and consideration with respect to Section 404 review. Based on NRCS mapping (SCS 1990), the Site contains approximately 27.2 acres of hydric soils and approximately 3.3 acres of partially hydric soils. The remaining 1.3 acres are non-hydric soils. The majority of the on-site and adjacent farmland was classified by NRCS in 1991 as Prior Converted Wetland, with 51.1 acres of land falling into the Highly Erodable Land classification (Appendix C). For planning purposes, hydric soils were used as a surrogate for a jurisdictional wetland boundary. Existing Site jurisdictional areas will be delineated and located for detailed Site analysis and included in the Final Mitigation Plan.

3.4.4 Hydrology

3.4.4.1 Groundwater

Periodic and prolonged river and stream flooding, fluvial sediment deposition, flood storage, and hydraulic energy dissipation represent important attributes of floodplains and riparian systems in the region. The infiltration of surface water (overland flow) and movement of groundwater through the permeable soil horizons generally flow along pathways that are a combination of downward, down slope, and radial vectors.

Because the slopes within these systems are low, the corresponding movement of water tends to be very slow. The surface water elevation of local streams directly relates to the surface of the groundwater elevation, and the stream will rise and fall as the water table fluctuate. Therefore, these stream channels (effluent stream) winding through these systems, intercept groundwater flow and thus represents base flow, groundwater withdrawal conveyances throughout most of the year.

The groundwater inputs represent the primary hydrologic factor in the development and maintenance of riparian wetlands at the Site. Wetland hydroperiods tend to be greatest along the outer floodplain at the toe of adjacent upland slopes (i.e., groundwater discharge areas). Hydroperiods decrease across the floodplain as the groundwater table approaches large stream channels (i.e., groundwater discharge features). Installation of a ditch network, in conjunction with the deepening and widening of on-site streams has significantly lowered the groundwater table and steepened the groundwater discharge gradient throughout much of the Site.

3.4.4.2 Surface Water

Topographically, the Site is generally expressed as containing relatively low gradient valleys and drainages with two defined Coastal Plain headwater systems that drain to Maple Swamp (Figure 3, Appendix B). Upstream and outside of the Site boundary, drainages become steeper with more pronounced gradients. During periods of high rainfall or where rainfall exceeds evapotranspiration, ground water levels rise to the surface and ponding is common. As groundwater levels rise, surface water and subsurface flows migrate toward localized depressional areas, and eventually migrate to the headwater drainages where water ponds and sheet flows down valley, gradually forming stream-like, braided channels. Under current conditions, ditches collect surface water and transport it rapidly to the downstream receiving waters (Maple Swamp).

3.4.5 Federally and State-Listed Species

The following table provides a list of Federally listed and State-listed species found within 2.0 miles of the Site. The data is based on a recent search on the South Carolina Heritage Trust Geographic Database of Rare and Endangered Species website. Potential habitat exists within the projects limits for most of the listed species. Further consultation with the South Carolina Division of Natural Resources (SCDNR) and United States Fish and Wildlife Service (USFWS) may be required to ensure that there will be no impacts to protected species.

Federally and State-Listed Species

Common Name	Scientific Name	Status* Federal	Status* State	Habitat Present
Rafinesque's Big-Eared Bat	*Corynorhinus rafinesquii*		SE	Yes
Bald Eagle	*Haliaeetus leucocephalus*	BGPA	S2	No

* SE – State endangered
S2 – Imperiled state-wide
BGPA – Bald and Golden Eagle Protection Act

3.5: TECHNICAL APPROACH FOR THE PROPOSED MITIGATION

3.5.1 Conceptual Mitigation Work Plan

The restoration concepts being developed for the Site follow a watershed approach for the stream restoration design. Therefore, the plan takes into account the surrounding land use and management practices that could realize additional benefit from having an adjacent restoration project in-place. The proposed restoration plan is depicted on Figure 6 (Appendix B) and described in detail below. After implementation, restoration activities are expected to provide the following stream and buffer planning units:

- restoration of approximately 4,249 linear feet of stream including approximately 2,489 linear feet of headwater (braided) restoration (upper reach of UT1 and UT2), 1,760 linear feet of Priority 1 restoration (middle reach of UT1), and 18.1 acres of associated minimum buffer.
- enhancement of approximately 7.5 acres of bottomland hardwoods and wooded swamp buffer along 1,100 linear feet of UT1.
- preservation of approximately 6.2 acres of bottomland hardwoods and wooded swamp buffer along 794 linear feet of UT1.

3.5.1.1 Stream Restoration

Stream restoration efforts using Priority 1 methodology (Rosgen 1996) are designed to restore a stable, stream that approximates the hydrodynamics and stream geometry relative to natural (or reference) conditions in the region. Primary activities designed to restore the channel on a new location may include: floodplain excavation at the point of ditch inflows, backfill of the existing ditches, floodplain soil preparation, relocation of waterfowl impoundments to the easement boundary, and excavation of a new low flow channel within the middle reach of UT1.

Stream restoration activities will restore the existing, entrenched channel with approximately 2,489 linear feet of braided DA-type channel configuration, and approximately 1,760 linear feet of stable, C-type channel. Restoration of these channels will reduce sediment and nutrient loading, introduce natural flooding frequencies within the floodplain, increase available in-stream habitat and associated micro-habitat, and lower water temperatures resulting from the shading by planted vegetation.

A transition floodplain may be excavated at the point of ditch inflows to UT1 and UT2. The objective of floodplain excavation is to reconnect the stream with the historic floodplain at an appropriate elevation, minimize hydrologic impacts upstream, and provide quicker flood dissipation from upstream in periods of high flow. Excavated material is expected to be used to backfill the existing channel location within the Site. Planting of the floodplain with native vegetation is expected to quickly stabilize and help reduce flow velocities in floodwaters, filter pollutants, and provide wildlife habitat.

After floodplain preparation in the upper reaches, a combination of stream types (DA-type and C-type) will be implemented on-site. No active stream channel excavation will be implemented for the design of the DA-type, braided headwater systems. Rather, the floodplain in these reaches will be allowed to passively form an anastamosed, channel system characterized by low sinuosity, low slope, micro-topographic ponding. At the confluence of UT1 and UT2, construction of a C-type, single-thread channel will be constructed. The proposed channel will be constructed to the average width, depth, and cross-sectional area derived from regional curves and reference reach data.

Stream banks and local belt-width area of the constructed C-type channel will be immediately matted with coir fiber matting. All channels will be planted with shrub and herbaceous vegetation typical of reference communities. Once the proposed design channel has been excavated and stabilized, the abandoned channels (ditches) will be filled with the material stockpiled from channel and floodplain excavation, as well as on-site, side-cast spoil material.

An erosion control plan and construction plan will be developed with future detailed construction plans. Erosion control will be performed locally throughout the Site and will be incorporated into the construction sequencing. Exposed surficial soils at the Site will include primarily dense, nutrient poor subsoils that do not vegetate rapidly after disturbance. Therefore, seeding with appropriate annual grasses and immediate planning with disturbance adapted woody species will be employed following the earth-moving process. Planting of the floodplain with native vegetation is expected to quickly stabilize and help reduce flow velocities in floodwaters, filter pollutants, and provide wildlife habitat.

Channel Backfilling

The abandoned channel will be backfilled using the adjacent spoil material. Additional spoil material from the construction of the new streams and floodplain excavation may be used to backfill the abandoned channel. The backfilled channel sections will be filled, compacted and graded to the approximate elevation of the adjacent wetland surface. The use of impermeable plugs is not anticipated due to the low valley gradient and the clay dominant soils found on-site. The existing spoil material is expected to be of sufficient strength to withstand the expected erosive energy of surface flows across the Site.

Riparian Best Management Practices

Riparian Best Management Practices (RBMPs) are proposed for this project that will go beyond the standard stream and wetland restoration methods used to re-establish natural streams, floodplains, and riparian condition and function. RBMPs measures are proposed that will provide additional reduction of sediment and nutrient loading from anticipated offsite runoff. RBMP treatments will include:

- **Livestock exclusion fencing** will be installed along portions of the conservation easement to eliminate direct livestock feces and urine into the on-site streams.

- **Restoration of minimum buffers** will be included in the easement boundary, based on a 75 foot average width outside of a defined stream channel.
- **Ford crossing** will be installed at two strategic points through breaks in the easement to allow farm equipment and livestock to reach the various pastures adjoining the Site.
- **Headwater detention ponds** may be incorporated in headwater areas to capture runoff from ephemeral drains or off-site ditches to detain storm water flows and sediment.

3.5.1.2 Buffer Enhancement

Stream buffer enhancement is designed to restore a fully functioning buffer system that will provide water storage, nutrient cycling, removal of imported elements and compounds; along with creating a variety and abundance of wildlife habitats.

Approximately 7.2 acres of buffer along the middle reaches of UT1 currently lacks adequate vegetation cover or species representative of a bottomland hardwood/ swamp complex that is typical for the region. Restoration of the stream buffer will be achieved primarily through plant community restoration activities restoration activities but may also involve 1) channel plug installation, 2) removal of side-cast spoil material, and 3) scarification of soils prior to planting.

3.5.1.3 Buffer Preservation

Buffer preservation will be targeted on protecting approximately 6.2 acres of existing stream buffer along approximately 794 linear feet of the lower reach of UT1. Exotic species management may be implemented within stream buffer preservation areas in order to further enhance the biological function and wildlife habitat. Preservation will be undertaken in order to protect these relatively undisturbed, ecologically important stream buffers that occur in proximity to restoration activities performed in the upper reaches.

3.5.1.4 Plant Community Restoration

Restoration of forested communities provides habitat for area wildlife and allows for development and expansion of characteristic wetland dependent species across the landscape. Plant community restoration within Site will include primarily the planting of bare-root or small containerized trees consistent with reference data, on-site observations, and plant community descriptions (Nelson 1986). Variations in vegetative planting may occur based on topographic locations, hydrologic variations, and hydraulic properties of the soil. Approximately 31.8 acres (ie, 16.2 acres Wooded Swamp and 9.4 acres Bottomland Hardwoods) of restored wetlands and stream buffer will undergo plant community restoration. Species expected to be used for this project may include the following canopy or sub-canopy elements. Figure 7 (Appendix B) identifies the location of each target community on the Site.

Wooded Swamp

1. Bald Cypress (*Taxodium distichum*)
2. Swamp Tupelo (*Nyssa biflora*)
3. Swamp Cottonwood (*Populus heterophylla*)
4. Carolina Ash (*Fraxinus caroliniana*
5. Pumpkin Ash (*Fraxinus profunda*)
6. Green Ash (*Fraxinus pennsylvanica*)
7. Water Elm (*Planera aquatica*)

Bottomland Hardwoods

1. Sweetgum (*Liquidambar styraciflua*)
2. Overcup Oak (*Quercus lyrata*)
3. Water Oak (*Quercus nigra*)
4. Willow Oak (*Quercus phellos*)
5. Laurel Oak (*Quercus laurifolia*)
6. Swamp Chestnut Oak (*Quercus michauxii*)
7. Cherrybark Oak (*Quercus pagodifolia*)
8. Green Ash (*Fraxinus pennsylvanica*)
9. American Sycamore (*Platanus occidentalis*)
10. American Elm (*Ulmus americana*)
11. Tulip Poplar (*Liriodendron tulipifera*)
12. Sweetbay Magnolia (*Magnolia virginiana*)
13. Ironwood (*Carpinus caroliniana*)

Species distribution and densities are expected to be determined during development of the detailed restoration plan.

3.5.2 Monitoring Plan

Monitoring of Site restoration efforts will be performed annually for five years or until agreed upon success criteria are fulfilled. Specific success criteria components are presented below.

3.5.2.1 Stream Restoration Success Criteria

Cross-sections

Permanent cross-sections will be established to document lateral stability of the channel. There should be little change in as-built cross sections. If changes do take place, an evaluation will be conducted to determine if it represents a movement toward instability (ie, downcutting and erosions) or a movement toward increased stability (ie, vegetation change, deposition, decreased w/d ratio). Cross-section will be classified using the Rosgen stream classification method and all monitored cross-sections should fall within the quantitative stream geometry parameters defined for channels of the designed stream type.

Longitudinal Profiles
An annual survey of the longitude longitudinal profile should indicate a stable bed form feature (ie not severely degrading or aggrading). The measured bed form should be consistent with reference channels of the designed stream type.

Bed Material Analysis
Bed material analysis is typically performed for stream restoration projects. However, because the proposed stream channels are expected to be dominated by sand and silt, pebble count procedures would not show a change in bed material size or distribution during the course of the project. Therefore, a bed material analysis is not recommended for this project.

Bankfull Events
Two bankfull events must be documented with the five-year monitoring period. The two bankfull events must occur in separate years. Otherwise, the stream monitoring will continue until two bankfull events have been documented in separate years.

Photo Reference Stations
Permanent photo stations will be established throughout the site to subjectively evaluate channel conditions including channel aggradation or degradation, bank erosion, riparian community development.

3.5.2.2 Vegetation Success Criteria

After planting the wetlands and stream buffers in winter or early spring, an initial evaluation will be performed to verify planting methods and to determine initial species composition and density. Supplemental planting and additional Site modifications will be implemented, if necessary.

During quantitative vegetation sampling in early fall of the first year, sample plots will be randomly placed within the Site. In each sample plot, vegetation parameters to be monitored include species composition and species density. Visual observations of the percent cover of shrub and herbaceous species will also be recorded.

The vegetative success criteria for the site will be the survival of at least 320 stems per acre of planted trees following the first three years of monitoring. Subsequently, 290 stems per acre must be surviving in year 4 and 260 trees per acre in year 5.

3.5.2.4 Additional Monitoring Activities

A limited baseline conditions analysis is proposed during the year prior to project implementation. Baseline groundwater elevations will be monitored within the proposed wetland restoration area and water quality monitoring within the channel will analyze various parameters that may include, but not limited to the following: turbidity, conductivity, dissolved oxygen (DO), temperature, pH, and fecal coliform bacteria. In addition, on-site and reference macrobenthic invertebrates analysis will be performed to assess whether it may be appropriate to monitor for macrobenthics in the future.

Monitoring the water quality parameters will be performed annually during the wetland and stream monitoring period for information purposes only, with the results incorporated into the annual monitoring reports. Monitoring of macrobenthics would be performed in Year 1, Year 3 and Year 5 of the monitoring period.

3.5.3 Implementation Schedule

EBX has extensive wetland restoration experience, and understands the most recent mitigation requirements and standards. Accordingly, EBX is in a strong position to implement this project in a timely and effective manner. A tentative phasing schedule for the proposed project is presented below based on an executed contract at Week 0.

Project Task	Scheduled Completion Date
Task 1: Submit Recorded Conservation Easement	2nd Q 2010
Task 2: Submit Final Restoration Plan	2nd Q 2010
Task 3: MRT Approval	2nd Q 2010
Task 4: Nationwide 404 Permit	2rd Q 2010
Task 5: Mitigation Site Earthwork	3rd Q 2010
Task 6: Site Planting	1st Q 2011
Task 7: Baseline Report/Install Vegetation Plots	1st Q 2011
Task 8: Submit Year 1 Monitoring Plan	4th Q 2011
Task 9: Submit Year 2 Monitoring Plan	4th Q 2012
Task 10: Submit Year 3 Monitoring Plan	4th Q 2013
Task 11: Submit Year 4 Monitoring Plan	4th Q 2014
Task 12: Submit Year 5 Monitoring Plan	4th Q 2015

3.5.4 Adaptive Management

To address the risk associated with failing to achieve the defined success criteria, two separate strategies are being employed. First, we will design and build the project to include a credit reserve as insurance against a variance in the credits realized at the end of the monitoring period from that which is planned for. Second, corrective action will be taken at the earliest sign that any portion of the project is not on track to meet success criteria by the end of the monitoring period. Finally, permittee will withhold funds in reserve until such time as performance milestones are achieved.

3.6: IMPACTS FOR WHICH COMPENSATORY MITIGATION IS BEING PROVIDED

See Section 1.3

3.7: REFERENCES

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USACE. 1987. Corps of Engineers Wetlands Delineation Manual. Tech. Rpt. Y-87-1, Waterways Experiment Station, COE, Vicksburg, MS.

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APPENDIX A: MITIGATION SUMMARY WORKSHEET

Alternate 1 Brittons Neck I-73

RESTORATION MITIGATION FACTORS FOR LINEAR SYSTEMS

Factors	Options				
Net Improvement	Moderate 0.1		Good 1.6-2.0		Excellent Restoration 2.1-3.0
Priority Category	Tertiary 0.05		Secondary 0.2		Primary 0.3
Control	Covenant Private 0.05	Covenant POA 0.1	Conservation 0.15	Transfer Fee Title 0.2	
Credit Schedule	Schedule 5 0	Schedule 4 0.02	Schedule 3 0.05	Schedule 2 0.08	Schedule 1 0.1
Kind	Category 5 0	Category 4 0.02	Category 3 0.05	Category 2 0.08	Category 1 0.1
Location	Zone 5 0	Zone 4 0.05	Zone 3 0.1	Zone 2 0.15	Zone 1 0.2

PROPOSED RESTORATION MITIGATION WORKSHEET FOR LINEAR SYSTEMS

Factor	UT 1 (north)	UT 2 (east)	UT 1 (below	
Net Improvement	3.00	3.00	3.00	
Priority Category	0.20	0.20	0.20	
Control	0.15	0.15	0.15	
Credit Schedule	0.05	0.05	0.05	
Kind	0.10	0.10	0.10	
Location	0.15	0.15	0.15	
Sum of M factors	3.65	3.65	3.65	
Mitigation Length (linear	1632	857	1760	
M X L=	5956.8	3128.05	6424	

Restoration/Enhancement Credits	15508.85
Mitigation Length (linear feet)	4249

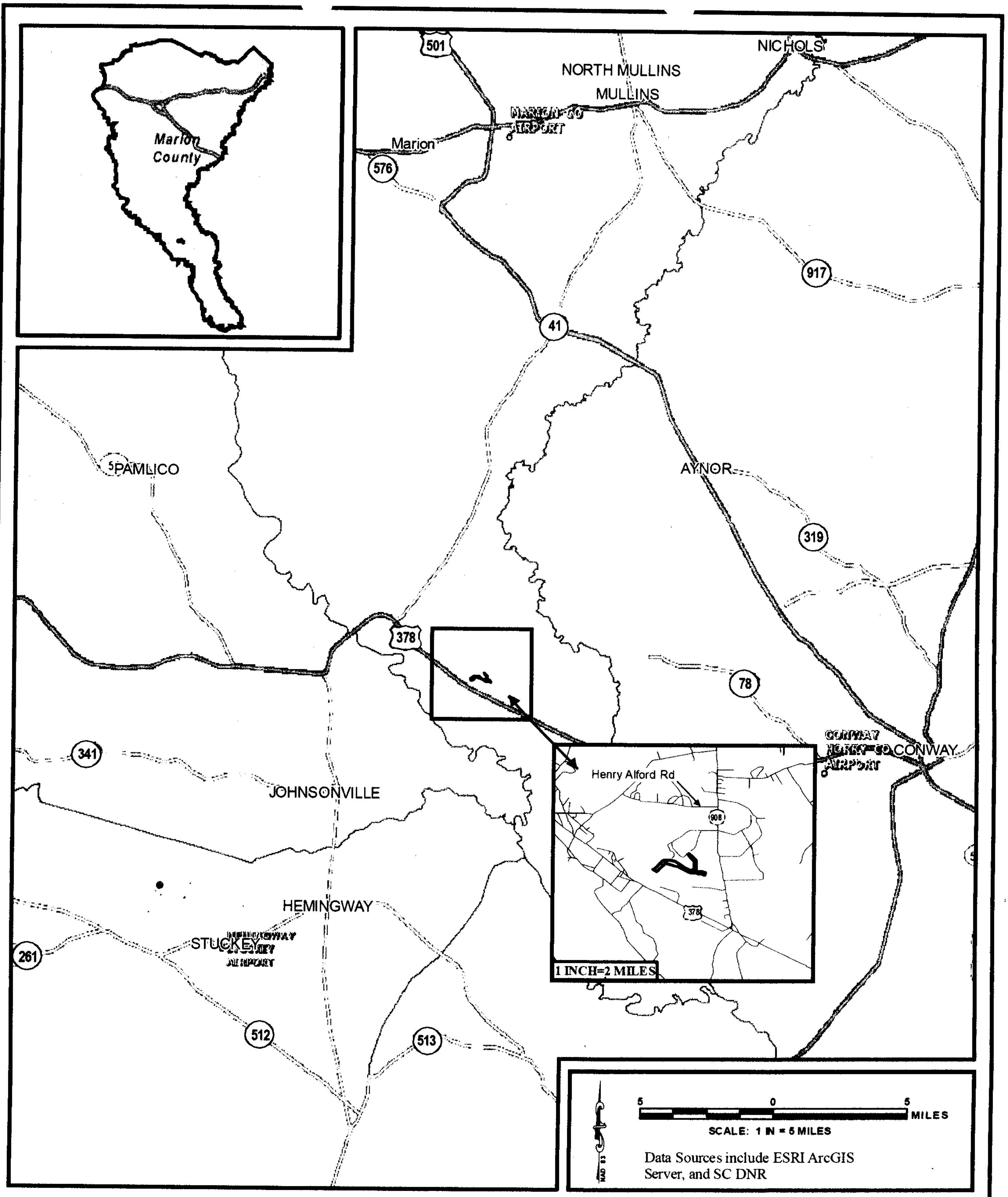
Factor		UT 1 (upper buffer)	UT 1 (lower buffer)
Net Improvement	Side A	0.40	0.25
Net Improvement	Side B	0.40	0.25
Control		0.15	0.15
Credit Schedule		0.05	0.05
Kind		0.10	0.10
Location		0.20	0.20
Sum of M factors		1.3	1
Mitigation Length (linear		1100	794
M X L=		1430	794
Reach Multiplier (RM)		1.25	1.25
RM		1787.5	992.5

1894 linear feet

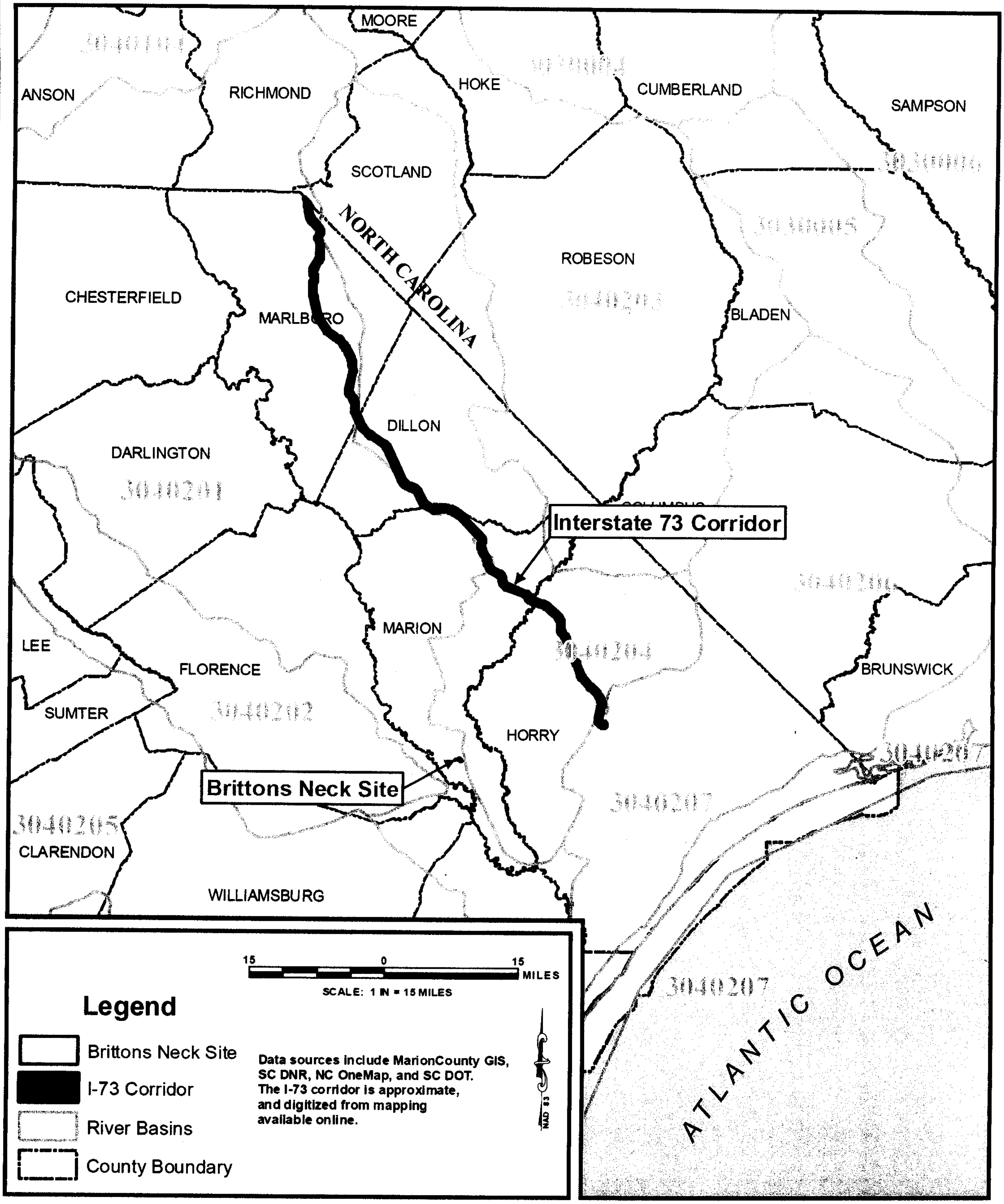
Buffer Credits	2780.0
Total Credits	18288.9
I73 Credits Needed	18220.0
Credit Surplus (+), Deficit (-)	68.9

APPENDIX B: FIGURES

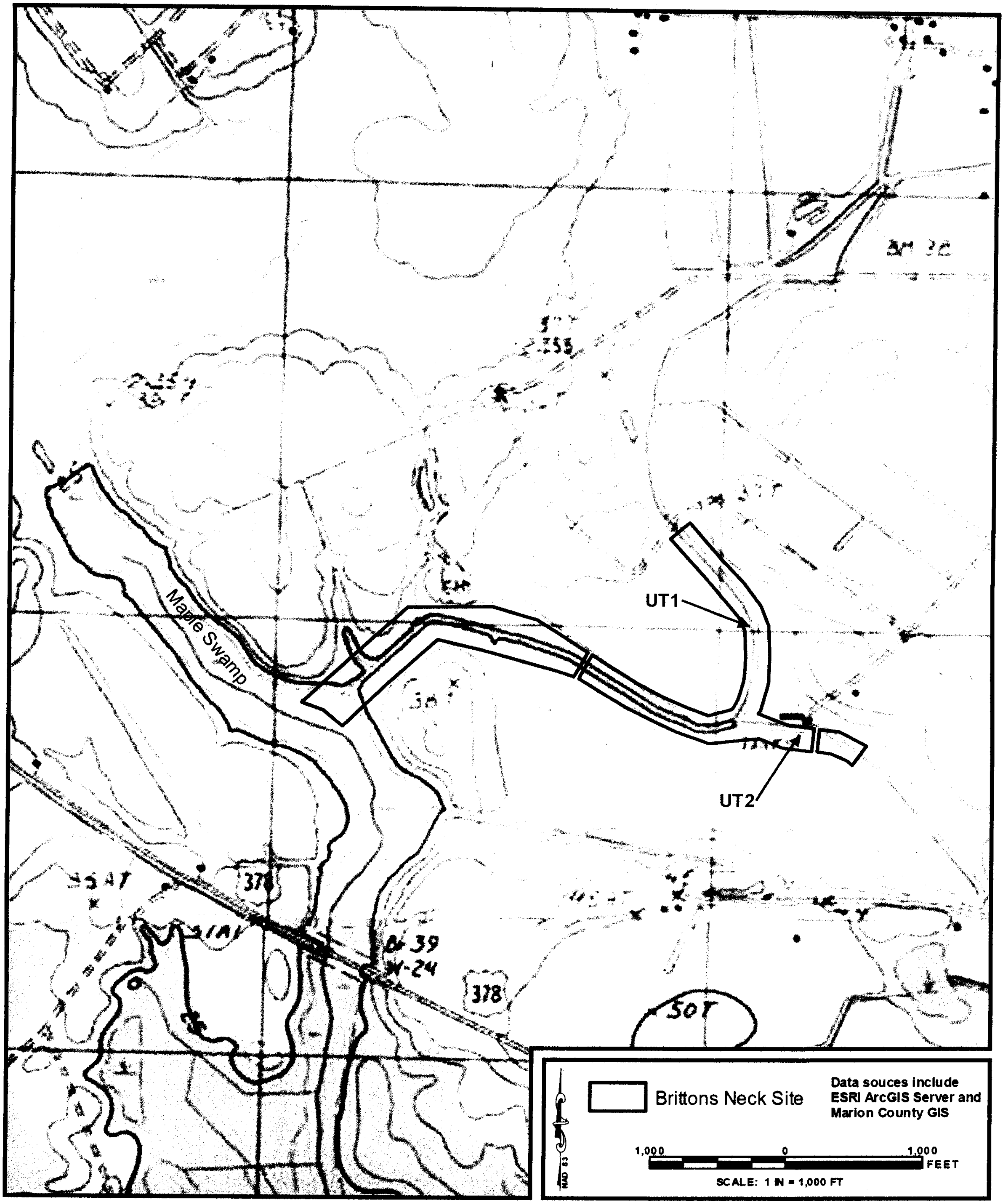
1. Site Location
2. USGS Hydrologic Unit Map
3. Site Topography
4. 2009 Aerial Photography
5. Soils Map
6. Restoration Plan
7. Proposed Planting Plan
8. Combined US 378 and I-73 Restoration Plan (Alternative 2)



Prepared By:	Prepared For:		Dwn By: MCG	FIGURE
PBSJ	EBX	SITE LOCATION I-73 CONCEPTUAL MITIGATION PLAN BRITTONS NECK SITE ALTERNATIVE I MARION COUNTY, SOUTH CAROLINA	Ckd By: JWG Date: JAN 2010 Project: 100010437	1



Prepared By:	Prepared For:			
PBSJ	EBX	USGS HYDROLOGIC UNIT MAP I-73 CONCEPTUAL MITIGATION PLAN BRITTONS NECK SITE ALTERNATIVE I MARION COUNTY, SOUTH CAROLINA	Dwn By: MCG Ckd By: JWG Date: JAN 2010 Project: 100010437	FIGURE 2



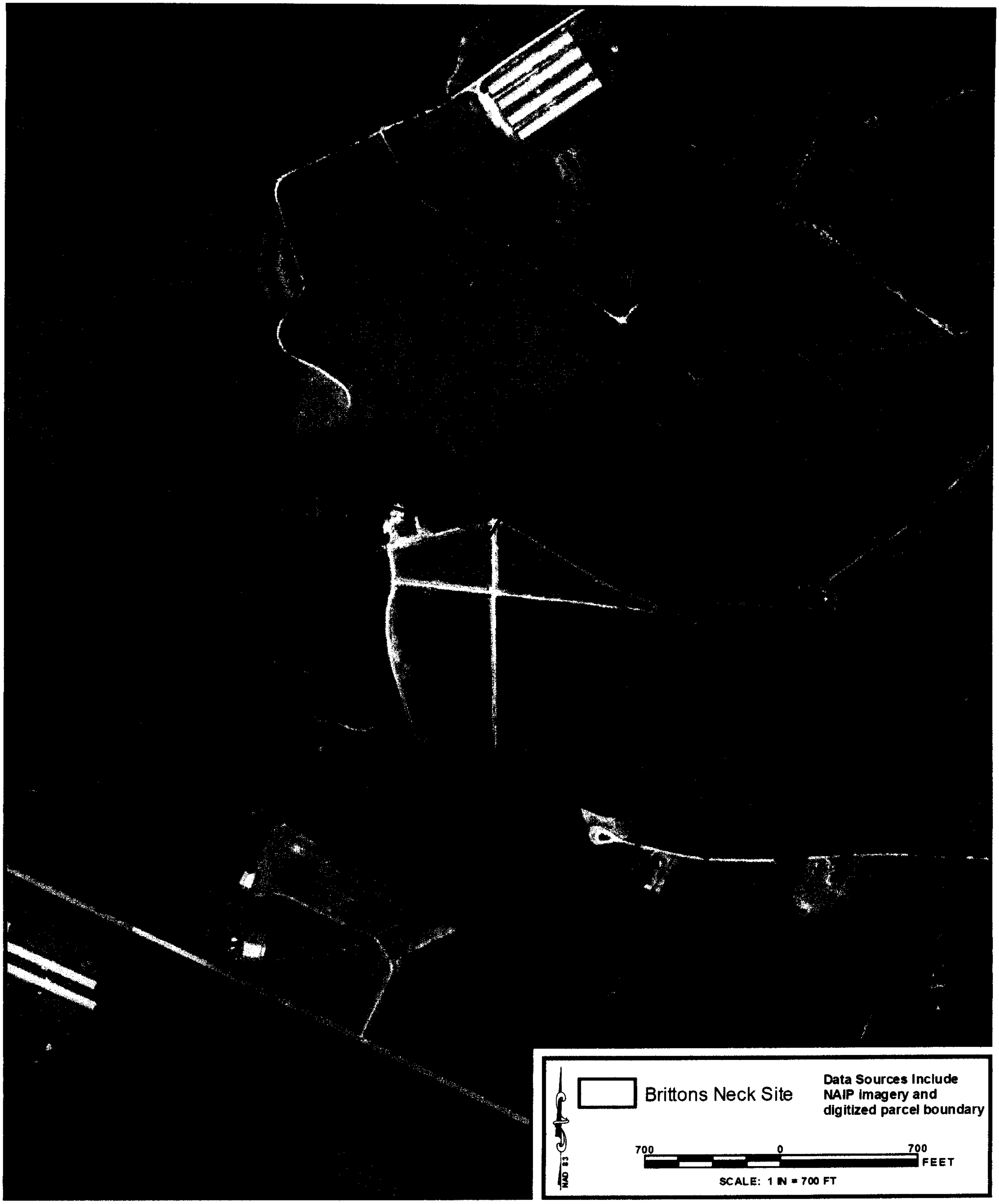
Prepared By: PBSJ

Prepared For: EBX

SITE TOPOGRAPHY
I-73 CONCEPTUAL MITIGATION PLAN
BRITTONS NECK SITE ALTERNATIVE I
MARION COUNTY, SOUTH CAROLINA

Dwn By: MCG
Ckd By: JWG
Date: JAN 2010
Project: 100010437

FIGURE 3



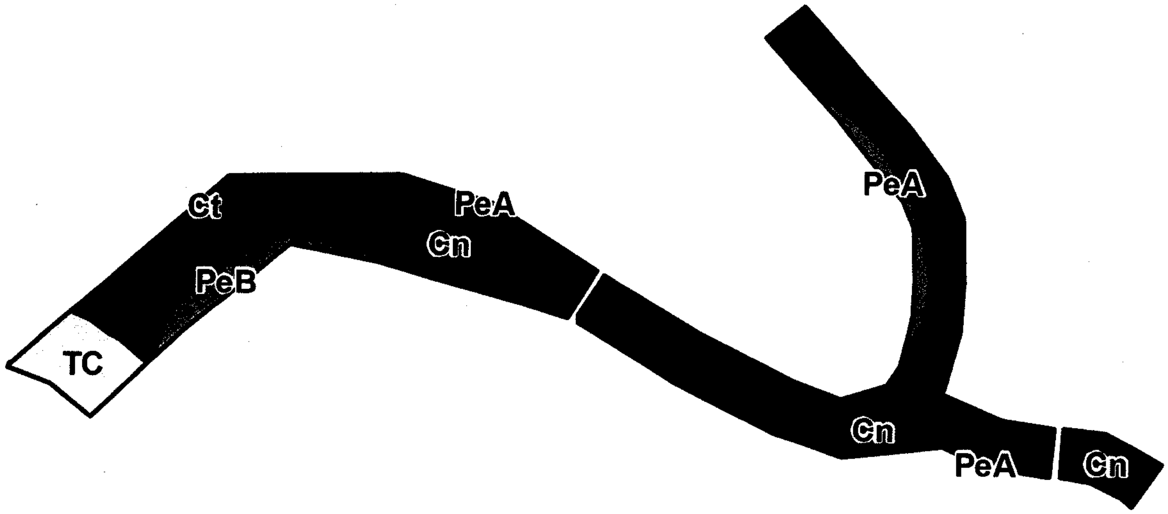
Prepared By: PBSJ

Prepared For: EBX

2009 AERIAL PHOTOGRAPHY
I-73 CONCEPTUAL MITIGATION PLAN
BRITTONS NECK SITE ALTERNATIVE I
MARION COUNTY, SOUTH CAROLINA

Dwn By:	MCG
Ckd By:	JWG
Date:	JAN 2010
Project:	100010437

FIGURE 4



Legend

Brittons Neck Site - 31.8 Acres

NRCS Soil Units

Hydric Soils - 27.2 Acres

Cn - Cantey Loam

Partially Hydric Soils - 3.3 Acres

Ct - Centenary Sand

PeA - Persanti Fine Sandy Loam (0-2% slopes)

TC - Tawcaw-Chastain Association

Not Hydric - 1.3 Acres

PeB - Persanti Fine Sandy Loam (2-6% slopes)

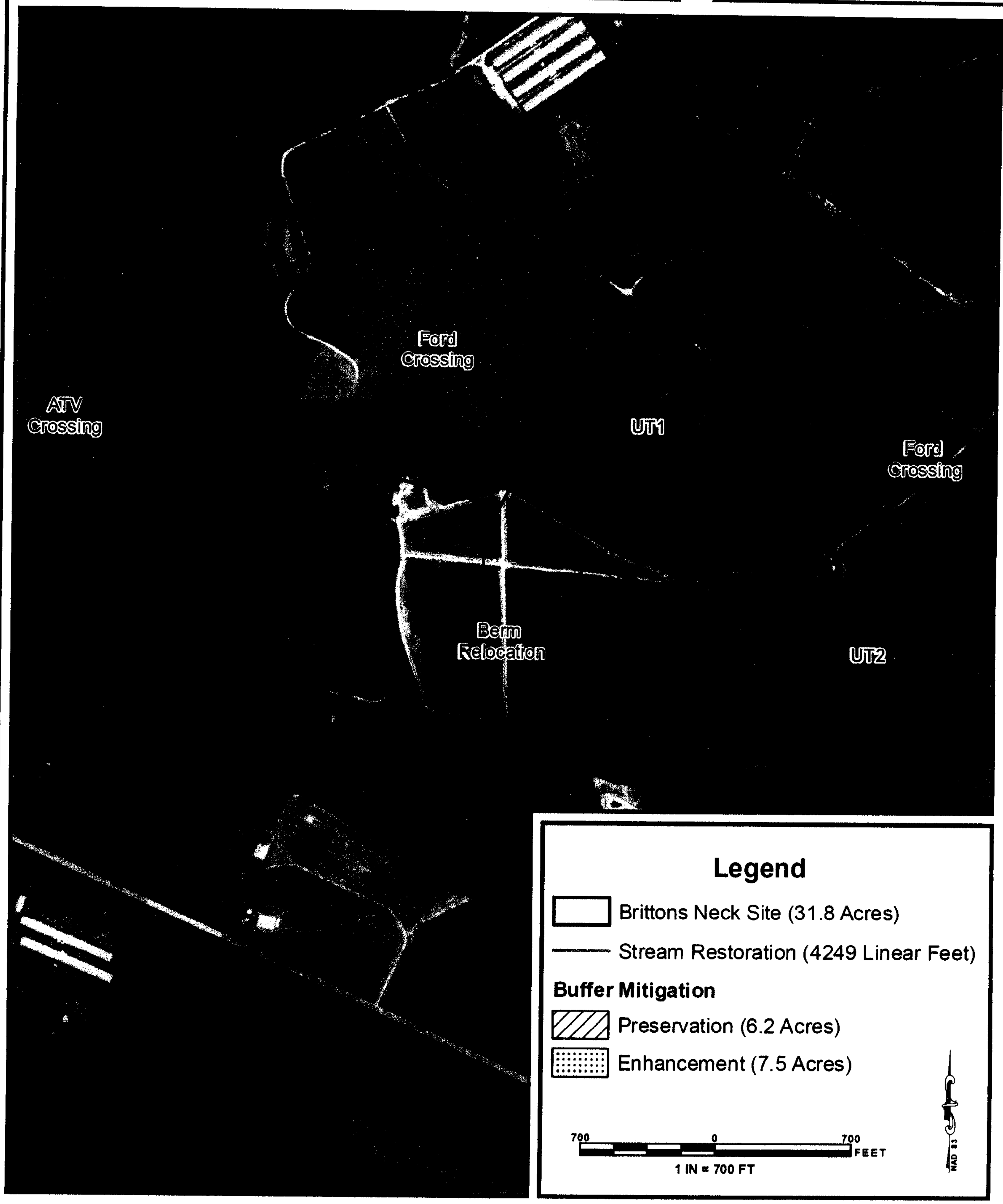
NAD 83

700 0 700 FEET

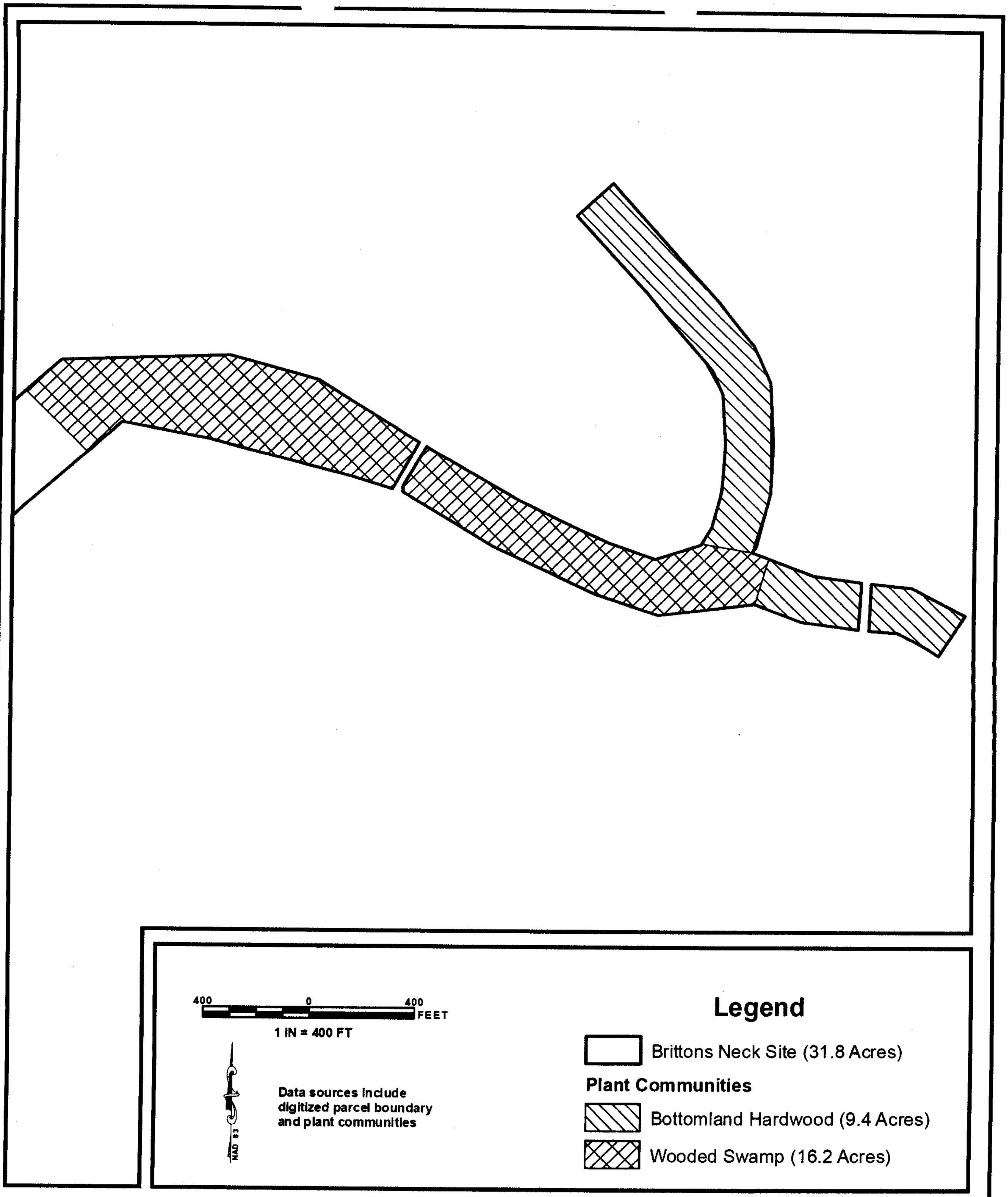
SCALE: 1 IN = 700 FT

Data Sources Include NRCS SSURGO Database and digitized parcel boundary

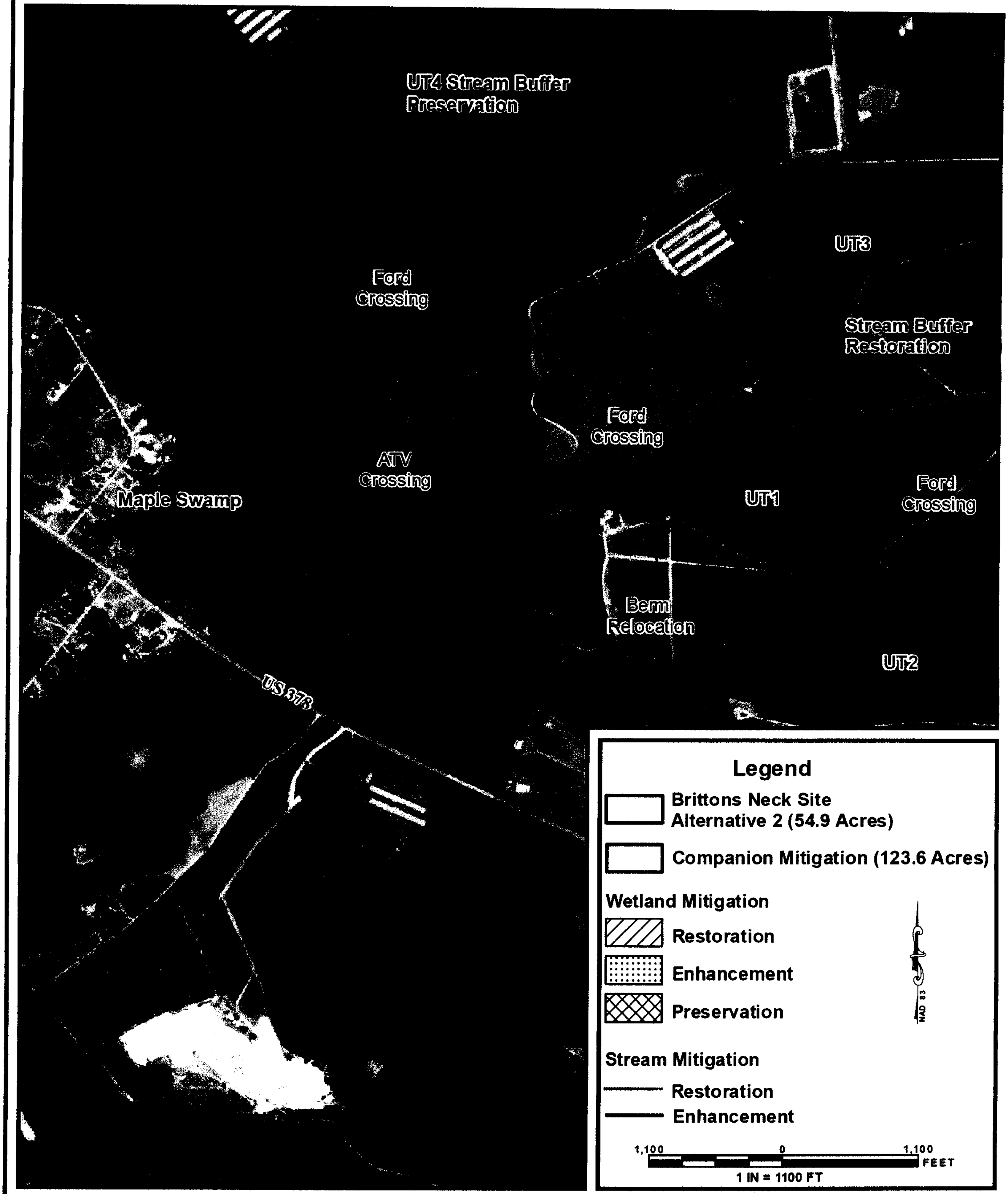
Prepared By:	Prepared For:			
PBS&J	EBX	SOILS MAP US 378 CONCEPTUAL MITIGATION PLAN BRITTONS NECK SITE ALTERNATIVE I MARION COUNTY, SOUTH CAROLINA	Dwn By: MCG Ckd By: JWG Date: JAN 2010 Project: 100010437	FIGURE 5



Prepared By:	Prepared For:			
PBS&J	EBX	PROPOSED RESTORATION PLAN CONCEPTUAL MITIGATION PLAN BRITTONS NECK SITE ALTERNATIVE I MARION COUNTY, SOUTH CAROLINA	Dwn By: MCG Ckd By: JWG Date: JAN 2010 Project: 100010437	FIGURE 6



Prepared By:	Prepared For:			FIGURE
PBSJ	EBX	**PROPOSED PLANTING PLAN** CONCEPTUAL MITIGATION PLAN BRITTONS NECK SITE ALTERNATIVE I MARION COUNTY, SOUTH CAROLINA	Dwn By: MCG Ckd By: JWG Date: JAN 2010 Project: 100010437	7



Prepared By:	Prepared For:			FIGURE
PBSJ	EBX	INTEGRATED RESTORATION PLAN CONCEPTUAL MITIGATION PLAN BRITTONS NECK SITE ALTERNATIVE 2 MARION COUNTY, SOUTH CAROLINA	Dwn By: MCG Ckd By: JWG Date: JAN 2010 Project: 100010437	8

APPENDIX C: HIGHLY ERODIBLE LAND AND WETLAND CONSERVATION DETERMINATION FORM (NRCS) AND MAP

Timmy Johnson
Britton, S.C.

FSA

Conservation Service

SCS-CPA-026
(1-88)

HIGHLY ERODIBLE LAND AND WETLAND CONSERVATION DETERMINATION

1. Name and Address of Person	2. Date of Request	3. County
~~Neal Byrd — Partners Farm~~ ~~Bx 542~~ ~~Mullins, SC 29574~~	4-02-91	Marion

Name of USDA Agency or Person Requesting Determination	5. Farm No. and Tract No.
ASCS FmHa	2531 T #113

SECTION I — HIGHLY ERODIBLE LAND

	Yes	No	Field No.(s)	Total Acres
soil survey now available for making a highly erodible land determination?	X			
re there highly erodible soil map units on this farm?	X			
ist highly erodible fields that, according to ASCS records, were used to produce agricultural commodity in any crop year during 1981-1985.			6,15,25	51.1
ist highly erodible fields that have been or will be converted for the production of agricultural commodities and, according to ASCS records, were not used for this purpose in any crop year during 1981-1985; and were not enrolled in a USDA set-aside or diversion program.				

This Highly Erodible Land determination was completed in the: Office [X] Field [ ]

NOTE: If you have highly erodible cropland fields, you may need to have a conservation plan developed for these fields. For further information, contact the local office of the Soil Conservation Service.

SECTION II — WETLAND

	Yes	No	Field No.(s)	Total Wetland Acres
Are there hydric soils on this farm?	X			
Wetlands (W), including abandoned wetlands, or Farmed Wetlands (FW). Wetlands may be farmed under natural conditions. Farmed Wetlands may be farmed and maintained in the same manner as they were prior to December 23, 1985, as long as they are not abandoned.				
Prior Converted Wetlands (PC) - The use, management, drainage, and alteration of prior converted wetlands (PC) are not subject to FSA unless the area reverts to wetland as a result of abandonment. You should inform SCS of any area to be used to produce an agricultural commodity that has not been cropped, managed, or maintained for 5 years or more.			2,3,4,5,6,7,8,9,10, 11,12,13,14,15,16,17, 18,19,20,21,22,23,24	
Artificial Wetlands (AW) - Artificial Wetlands includes irrigation induced wetlands. These Wetlands are not subject to FSA.				
5. Minimal Effect Wetlands (MW) - These wetlands are to be farmed according to the minimal effect agreement signed at the time the minimal effect determination was made.				
6. Converted Wetlands (CW) - In any year that an agricultural commodity is planted on these Converted Wetlands, you will be ineligible for USDA benefits. If you believe that the conversion was commenced before December 23, 1985, or that the conversion was caused by a third party, contact the ASCS office to request a commenced or third party determination.				

17. The planned alteration measures on wetlands in fields ____________ are considered maintenance and are in compliance with FSA.

18. The planned alteration measures on wetlands in fields ____________ are not considered to be maintenance and if installed will cause the area to become a Converted Wetland (CW). See item 16 for information on CW.

19. This wetland determination was completed in the: Office [X] Field [ ]

20. This determination was: Delivered [ ] Mailed [ ] To the Person on Date: ____________

NOTE: If you do not agree with this determination, you may request a reconsideration from the person that signed this form in Block 22 below. The reconsideration is a prerequisite for any further appeal. The request for the reconsideration must be in writing and must state your reasons for the request. The request must be mailed or delivered within 15 days after this determination is mailed to or otherwise made available to you.

NOTE: If you intend to convert additional land to cropland or alter any wetlands, you must initiate another Form AD-1026 at the local office of ASCS. Abandonment is where land has not been cropped, managed, or maintained for 5 years or more. You should inform SCS if you plan to produce an agricultural commodity on abandoned wetlands.

21. Remarks OWNER: EDWARD L. WILLIAMS NEW OWER TIMMY JOHNSON

A wetland determination has been done on the cropland only. A wetland determination will be needed if you plan to change any grassland or wooded areas to produce an annual crop.

22. Signature of SCS District Conservationist

23. Date

Howard Fedua

SECTION 4. QUALIFICATIONS

The EBX Team

EBX has assembled a Team of highly qualified and experienced professionals to implement the mitigation projects specified in this Proposal. This Team includes PBS&J as the primary environmental consultant and Milliken Forestry as the primary forest management consultant.

4.1 Representative Projects

Environmental Bank & Exchange, LLC

EBX has worked with a wide variety of public and private clients to provide solutions to meet that meet the specific mitigation requirements of a client's project. The breadth of our experience is demonstrated in the stream, wetland and upland project lists shown in Section 4.B. The qualifications of the EBX professional team are in Section 4.C.

To give you a sense of our capabilities, we have outlined two specific EBX projects that incorporate both stream and wetlands restoration. The first example describes a turnkey project for a major mining company in the Southeast. The second example illustrates a completed project from which we generated stream and wetland credits that were sold to the North Carolina Ecosystem Enhancement Program.

Sample Project A

EBX was engaged by the client to provide a mitigation solution to offset wetland and stream impacts associated with their mine expansion. EBX's customized solution was designed to address both current and future mitigation needs for the client, and generate credits by restoring over 16,700 linear feet of stream and 1,000 acres of wetland for the client. The mitigation site will be restored back to a functional forested ecosystem with non-riparian wetland on the wet flats and riparian wetlands along the meandering coastal streams.

Core to the success of this project is the role of EBX in negotiating with the regulatory agencies on the restoration requirements unique to the site and the resulting credit ratios.

EBX's full service solution included:

- Reviewing the locations and timing of ecosystem mitigation needs
- Negotiating with regulators and engineers to define restoration methods unique to sites in the coastal plain
- Comprehensive land search for qualifying mitigation properties
- Performing, for a fixed price, the turn-key ecosystem restoration required to generate the required number of credits
- Assuming the post-construction liability for maintaining the restored ecosystem

Sample Project B

The North Carolina Environmental Enhancement Program sought a restoration project to offset the disturbance of a stream in conjunction with the North Carolina Department of Transportation road-building activity.

The project, which was is a site of the Neu-Con Umbrella Mitigation bank, has resulted in the restoration of 66.2 acres of fully functioning wetlands and 5,414 feet of stream. The Mitigation Banking Instrument was approved by the North Carolina Mitigation Banking Review Team in the fall of 2002. The site is protected by a permanent conservation easement that will be maintained by the North Carolina Wildlife Foundation; this includes the preservation and protection of 70 additional acres of wetland on the site. Wetland and stream credits produced by the project were sold to the North Carolina Department of Transportation as compensatory mitigation for wetland impacts within the Neuse hydrologic unit 03020201.

A detailed site specific Restoration Plan for the site was prepared and implemented by EBX. Restoration included blocking and filling the drainage ditches to raise the local water table and restore site hydrology; reconstructing the main channels for surface water flow leaving the site; adjusting the topography of the site to reflect the original wide, saturated swamp flat condition that existed prior to agricultural use; and vegetating the site with native bottomland hardwood species. After five years_of monitoring, the site has met the hydrologic, vegetative and stream success criteria established by NC MBRT, and is now a fully functional forested ecosystem.

PBS&J

PBS&J has over 450 employees in our environmental sciences groups, including 30-plus staff in the Mid-Atlantic region. Our Raleigh office location is staffed with more than 15 scientists and will serve as the home base for the Joyner Bay project. PBS&J Raleigh staff specializes in all aspects of ecological restoration including jurisdictional area delineations, soil surveys, permitting, mitigation planning, design, implementation, construction management, hydrologic and hydraulic engineering, surface and groundwater modeling, and mitigation monitoring. The PBS&J team has provided consulting services for restoration of numerous streams and wetlands throughout the Carolinas. This includes all phases of project involvement from feasibility assessments to post construction monitoring. These are just a representative sample of our relevant project experience.

North Tyger River Tributary (Spartanburg County, SC)

The South Carolina Department of Transportation (SCDOT) implemented improvements to SC Route 290 in Spartanburg County, South Carolina. Extensive fill operations had impacted approximately 555 feet of jurisdictional stream. PBS&J was brought in to develop restoration and construction plans for a stream mitigation site, encompassing approximately 5 acres of land, located immediately adjacent to the new alignment. PBS&J developed construction plans to restore approximately 1300 linear feet of stream channel, including excavation of a new floodplain adjacent to restored channel reaches. This Priority II restoration approach (per Rosgen methodology) provided stream stability and reestablished a hydraulic connection between the channel and excavated floodplain. The project involved restoration of two stream types (per Rosgen classification) on new locations within the upper and lower reaches of the Site.

In the upper reaches of the Site, restoration efforts included the re-routing of a headwater seep into a newly constructed valley adjacent to the new roadway alignment. The stable, high slope stream excavated within this new valley joined with a culverted ephemeral channel to form the lower reach stream. Stream mitigation efforts along the lower reach included the construction of a shallow, meandering, riffle-pool stream channel on the adjacent floodplain, and the re-establishment of natural groundwater hydro periods across the adjacent floodplain surface. Following grading activities, the Site was planted with bare root seedlings to best recreate historic vegetative communities.

ABC Mitigation Site (Beaufort County, NC)

This project performed for the NCDOT an involved the plant community restoration of 455-acre site in Beaufort County that had been cleared and ditched for farming. The site offered 187 acres of prior converted farmland for restoration. The site is part of the Acre Swamp floodplain with former cleared agricultural fields forming part of the adjacent, interstream terrace system. Restoration was largely based on adjacent reference ecosystems and the detailed restoration studies conducted by our team. PBS&J designed a series of shallow depressions throughout the property to capture and maintain runoff and precipitation, along with filling of former field ditches. These multiple small pools mimic natural topographic variations in the landscape as found in nearby reference wetlands. PBS&J provided the design schematics to NCDOT that allowed state forces to build the project without the need for expensive construction plans or engineered drawings. PBS&J staff was selected to provide construction management services.

Whitelace Creek (Lenoir County, NC)

This project performed for the NC Ecosystem Enhancement Program (EEP) involved an evaluation of stream and wetland restoration opportunities at a 37-acre site within the Whitelace Creek watershed located approximately 0.9 mile from the creek's confluence with the Neuse River in Lenoir County, NC. EcoScience provided detailed restoration planning, construction plans, and construction oversight to restore both stream and wetland functions associated with water quality and a regional wildlife corridor connecting to the Neuse River. Specific restoration activities included the excavation of a floodplain at bank full elevation adjacent to both sides of Whitelace Creek, stream channel enhancement, site planting with characteristic native species, and the enhancement of floodplain micro topographic, variation which included the decommissioning of a dairy waste lagoon. Restoration activities are expected to result in 1) the reestablishment of characteristic bank full dimensions and flood frequency to approximately 3,400 linear feet of stream channel; 2) the restoration of approximately 5.5 acres of wetlands; 3) the enhancement of approximately 16.5 acres of wetlands; and 4) the restoration and enhancement of approximately 12.4 acres of stream buffer.

Dover Bay (Craven County, NC)

The Authority has purchased and restored the approximately 3151-acre Dover Bay, a threatened and rare Carolina Bay wetland ecosystem in eastern North Carolina. Dover Bay is located approximately 1.0 mile northwest of Cove City in western Craven County (Figure 7, Appendix A). The restoration and enhancement work included 10 miles of ditch and road removal, planting of more than 150,000 tree seedlings, and construction of control weirs to regulate water entering and leaving the site. Dover Bay provides the bulk of non-riverine mitigation for NCGTP project impacts. Restoration activities within Dover Bay primarily include reforestation activities, road and ditch removal, hydrologic and vegetation monitoring, restoration of endangered and threatened species habitat, and selective site burning/ground preparation.

Stonyton Creek (Lenoir County, NC)

This project performed for the NC Global Transpark (NCGTP) consisted of stream and wetland restoration as part of a natural resource evaluation and master planning for the 15,726-acre Transpark in Kinston, NC. PBS&J provided detailed restoration planning, construction plans, and construction oversight to restore both stream and wetland functions within the Stonyton Creek system, which flows through NCGTP and receives most of the runoff from the airport. Approximately 3,000 linear feet of Priority 1 stream restoration was completed. This work involved the conversion of a channelized G stream to a meandering E system. Stream bank stabilization and floodplain reforestation was a priority. In addition, extensive floodplain restoration including the removal of exotic species, placement of in-channel structures to encourage passive channel restoration, and supplemental planting of more than 100,000 trees was performed.

Bishop Site (Anson County, NC)

This project performed for EEP involved an evaluation of stream and wetland restoration opportunities at a 94.9-acre site within the Yadkin River basin in Anson County, NC. There are three stream restoration areas on-site, including Camp Branch, Dula Thoroughfare, and an unnamed tributary (UT) to Dula Thoroughfare. Each of these streams had been historically dredged and straightened, and adjacent riparian buffers were greatly diminished or removed. Site restoration plans were developed to restore historic stream, floodplain, and wetland functions. Specific restoration activities include the excavation of appropriately sized stream channels on new location adjacent to impacted reaches of Camp Branch and Dula Thoroughfare. Bank full benches (floodplains) were also excavated adjacent to the restored streams. Rock sill grade control structures were installed along the UT to Dula Thoroughfare where head cuts were adversely affecting stream channel stability. The removal of invasive species was performed prior to site planting of characteristic native species. Restoration activities are expected to result in 1) the reestablishment of characteristic bank full dimensions and flood frequency to approximately 7,200 linear feet of stream channel; 2) the restoration of approximately 5.0 acres of riparian wetlands; and 3) the enhancement of approximately 1.0 acre of riparian wetlands.

Cutawhiskie Creek (Hertford County, NC)

This project performed for Restoration Systems consisted of an evaluation of stream and wetland restoration opportunities at a 23-acre site within the Cutawhiskie Creek watershed in western Hertford County, NC. PBS&J provided detailed restoration planning, construction plans, and construction oversight to restore function and habitat to both streams and wetlands by means of pollution removal, sediment reduction, and floodwater attenuation. Specific activities included 1) the restoration of approximately 1,970 linear feet of stream channel through the construction of a stable E-type stream; 2) restoration of approximately 12.3 acres of riparian wetland; 3) preservation of approximately 2,786 linear feet of stream; and 4) exotic species removal with natural plant community re-vegetation.

Milliken Forestry

Scotswood Plantation, Williamsburg County, SC

Example 1 – Project area was approximately two hundred fifty acres of bedded loblolly pine. Area was final harvested removing loblolly pine completely. Beds were removed and longleaf pine was hand planted at a rate of two hundred twenty five seedlings per acre. There was no chemical site prep used due to conflicts with quail management objectives. Survival rate was approximately seventy percent.

Example 2 – Fifty to one hundred acres annually were restored to longleaf pine on an ongoing basis between 2004 and 2009. Areas were largely loblolly stands that were final harvested. Prescribed fire was used for site prep and seedlings were flat planted at a rate of two hundred twenty five seedlings per acre. No chemical was applied due to conflicts with quail management objectives.

Brosnan Forest, Dorchester County, SC

There has been an ongoing longleaf restoration effort at Brosnan Forest over the past several years. Most of the areas restored were mature loblolly stands that were final harvested. Chemical site prep was used and seedlings were planted back at a rate of four hundred fifty trees per acre. Both machine and hand planting has taken place. Survival rates have ranged from eighty to ninety percent. Prescribed was reintroduced at age one.

4.2 Project List

Environmental Bank & Exchange, LLC

EBX Wetland Restoration Projects

South Carolina

(i) *Rowland-Seibels Bank (Georgetown County)* - 1,850 acre wetlands mitigation bank, including a storm water management component (prospectus approved 2000, project pending market demand).

(ii) *Georgetown Airport Site (Georgetown County)* – 112 acre wetlands mitigation site (initiated August 2007; completed Winter 2008).

Virginia

(i) *Upper Rappahannock Site (Orange County)* – 20 acre off-site wetlands mitigation (initiated Spring 2007; construction completed Winter 2008).

(i) *Chickahominy Environmental Bank (Charles City County)* - Sponsored 400-acre wetland mitigation bank on Chickahominy River, Virginia (MBI approved and assigned interest in MBI to partner in February 2000).

(ii) *Chesapeake Wetland Mitigation Bank (City of Chesapeake)* – MBI finalized for wetland mitigation bank. Of the 1,146 acre property; half is anticipated to be annexed by the Great Dismal Wildlife Refuge and the remainder will be placed in the mitigation bank. (construction to be initiated Spring 2010).

North Carolina

(i) *Hell Swamp Site (Beaufort County)* – 990 WMU of wetland mitigation (site search initiated Fall 2005; site selected and concept plan developed Spring 2007).

(ii) *Transco Mitigation (Johnston County)* – 20-acre off-site wetlands mitigation project for pipeline construction (started and completed in 1999).

(iii) *Neu-Con Umbrella Bank* – Umbrella wetlands mitigation bank totaling 519 credits, (consisting of eight sites), representing an award made by the North Carolina Department of Transportation (initiated September 1999; sold all credits in November 2000; initiated construction on first site October 2, 2001; construction complete on all sites by early Spring 2005; easements recorded on first two preservation sites in early Spring 2003).

(a) *Casey-King Site (Lenoir County)* – 37 WMU of wetland restoration

(b) *Westbrook Site (Johnston County)* – 80 WMU of wetland restoration and preservation with associated stream mitigation

(c) *Alexander Site (Greene County)* – 19 WMU of wetland restoration

(d) *Nahunta Site (Wayne County)* – 120 WMU of wetland restoration and preservation with associated stream mitigation

(e) *Marston Site (Jones County)* – 67 WMU of wetland restoration and preservation with associated stream mitigation

(f) *Valentine Site I (Lenior County)* – 117 WMU of wetland preservation

(g) *Valentine Site II* (Lenior County)– 50 WMU of wetland preservation

(h) *Tull-Wooten Site* – 29 WMU of wetland preservation

(iv) *Gregory Site (Halifax County)* - 75 acre wetlands restoration project, including a stream restoration component (initiated July 2003; completed Spring 2005).

(v) *Jones Creek Site (Anson County)* – 26 WMU of wetland restoration with associated stream component (initiated July 2004; construction Spring 2006).

(vi) *Haw Branch Site (Onslow County)* – 25 WMU of wetland restoration with associated stream component (initiated July 2004; construction Spring 2006).

(vii) *Cox Site (Johnston County)* - 41.9 WMU of wetland restoration with associated stream component (initiated July 2004; construction underway with completion targeted for early Spring 2006).

(viii) *South Fork Hoppers Site (McDowell County)* – 5.6 WMU of wetland restoration with associated stream component (initiated July 2004; construction Spring 2006).

(ix) *Bailey Fork Creek Site (Burke County)* – 13.9 WMU of wetland restoration with associated stream component (initiated July 2004; construction Spring 2006).

(x) *Conoconarra Swamp Site (Halifax County)* – 87 WMU of wetland restoration with associated stream component (initiated July 2005; construction completed Spring 2007).

(xi) *Floogie Site (Bertie County)* – 25 WMU of wetland restoration associated with stream restoration (initiated March 2006, construction completed Spring 2008).

(xii) *Beaverdam Swamp Site (Harnett County)* – 9 WMU of wetland restoration associated with stream restoration (initiated July 2006; construction completed Winter 2007).

(xiii) *North Muddy Creek Site (McDowell County)* – 12 WMU of wetland restoration associated with stream restoration (initiated January 2007; construction completed Winter 2008).

(xiv) *Newtown Site (Union County)* – 3.2 WMU of wetland restoration associated with stream restoration (initiated September 2009; construction targeted for completion Winter 2010).

(xv) *North Fork Mountain Creek site* - 3.4 WMU of wetland restoration associated with stream restoration (initiated September 2009; construction targeted for completion Winter 2010).

<u>Florida</u>

(i) *Sundew Bank (Clay County)* - Partner in 2,000 acre wetlands mitigation bank. Permitting completed, construction has been started; credits are now being sold (initiated in February 2000, bank approved October 2001, construction initiated October 2001).

(ii) *Bluefield (St. Lucie County)* - Partner in 2,700 acre wetlands mitigation bank. Permitting completed credits are now being sold; construction has been started (initiated November 2000, bank approved November 2001, construction initiated November 2001).

<u>Idaho</u>

(i) Green Ranch at Lake Cascade Environmental Bank – 2,000 acre wetland and stream mitigation bank located at Lake Cascade. Prospectus submitted in March, 2009. EBX is the designated bank sponsor.

EBX Stream Restoration Projects

Virginia

(i) *Mountain Run Mitigation (Orange County)* - 4,500 linear feet of off-site stream restoration project (initiated Fall 2001; completed Winter 2003).

(ii) *Fairfax County Stream Mitigation Bank (Fairfax County)* – EBX was contracted to develop stream mitigation for the Dulles Airport expansion on Fairfax County land. (Pending market demand)

(iii) *Headwaters of the New Umbrella Bank* - Public notice of Prospectus on January 12, 2009 to establish stream mitigation on two sites consisting of over 10,000 stream credits (initiated June 2008; pending market demand)

North Carolina

(i) *Neu-Con Umbrella Mitigation Bank* – 22,964 linear feet of stream restoration with credits sold to North Carolina DOT (initiated November 2000; design initiated December 2001; construction completed on all sites by Spring 2005).

(a) *Westbrook Site (Johnston County)* – 5,414 SMU of stream restoration with associated wetland mitigation

(b) *Marston Site (Jones County)* – 6,380 SMU of stream restoration with associated wetland mitigation

(c) *Nahunta Site (Wayne County)* – 11,170 SMU of stream restoration with associated wetland mitigation

(ii) *Hell Swamp Site (Beaufort County)* – 16,780 SMU of coastal stream mitigation (site search initiated Fall 2005; site selected and concept plan developed Spring 2007; construction targeted for completion Spring 2008).

(iii) *City Pond Site (Anson County)* – 10,667 linear feet of stream restoration (initiated July 2003; construction completed Spring 2005).

(iv) *South Fork Site (Catawba County)* – 11,260 linear feet of stream (initiated July 2003; completed Spring 2005).

(v) *Open Springs Site (Randolph County)* – 4,520 linear feet of stream restoration (initiated July 2003; completed Spring 2005).

(vi) *Stonebridge Site (Moore County)* – 6,240 linear feet of stream restoration (initiated July 2003; construction completed Spring 2006).

(vii) *Jones Creek Site (Anson County)* – 4,032 SMU of stream restoration with associated wetland component (initiated July 2004; construction completed Spring 2006).

(viii) *Haw Branch Site (Onslow County)* – 10,000 SMU of stream restoration with associated wetland component (initiated July 2004; construction completed Spring 2006).

(ix) *Cox Site (Johnston County)* – 6,900 SMU of stream restoration with associated wetland component (initiated July 2004; construction completed Spring 2006).

(x) *Cleghorn Creek Site (Rutherford County)* – 5,000 SMU of stream restoration (initiated July 2004; construction completed Spring 2006).

(xi) *Silver Creek Site (Burke County)* – 6,779 SMU of stream restoration (initiated July 2004; construction completed Spring 2006).

(xii) *South Fork Hoppers Site (McDowell County)* – 7,200 SMU of stream restoration with associated wetland component (initiated July 2004; construction completed Spring 2006).

(xiii) *Bailey Fork Creek Site (Burke County)* – 9,220 SMU of stream restoration with associated wetland component (initiated July 2004; construction completed early Spring 2006).

(xiv) *Conoconarra Swamp Site (Halifax County)* – 5,000 SMU of stream restoration with associated wetland component (initiated July 2005; constructed completed Spring 2007).

(xv) *Floogie Site (Bertie County)* – 11,325 SMU of stream restoration (initiated March 2006; construction completed Spring 2008).

(xvi) *601 North and 601 West Sites (Union County)* – 7,500 SMU of stream restoration (initiated July 2006; construction completed Winter 2007).

(xvii) *Wolf Pond Site (Union County)* – 4,500 SMU of stream restoration (initiated July 2006; construction completed Winter 2007).

(xviii) *Beaverdam Swamp Site (Harnett County)* – 10,200 SMU of stream restoration with associated wetland restoration (initiated July 2006; construction completed Winter 2007).

(xix) *Morgan Creek Site (McDowell County)* – 11,118 SMU of stream restoration (initiated July 2006; construction completed Spring 2008).

(xx) *North Muddy Creek Site (McDowell County)* – 5,014 SMU of stream restoration with associated wetland restoration (initiated January 2007; construction completed Spring 2008).

(v) Gregory Site (Halifax County) – 6,500 SMU of stream restoration with associated wetland component (initiated July 2003; completed Spring 2005).

(vi) Newtown Site (union County) – 5,000 SMU of stream restoration with associated wetland component (initiated September 2009; construction completion scheduled for Winter 2010)

(vii) North Fork Mountain Creek Site - 5,000 SMU of stream restoration with associated wetland component (initiated September 2009; construction completion scheduled for Winter 2010)

<u>Georgia</u>

(i) *Rocky Grove Site (Rabun County)* – 5,150 linear feet of stream and buffer restoration (initiated May 2007; construction targeted for completion Spring 2010).

EBX Riparian Buffer Projects

North Carolina

(i) *Hargett Site (Lenior County)* – 16 BMU of riparian buffer restoration (initiated in 2003; projected completed in 2008)

(ii) *Whitley Site (Johnston County)* – 17.5 BMU of riparian buffer restoration (initiated 2005; scheduled for completion 2010)

(iii) *Neuse Riparian Buffer Umbrella Mitigation Bank*

(a) *Westbrook Site (Johnston County)* – 8.2 BMU and 42,000 pounds of nutrient reduction credits associated with riparian buffer restoration

(b) *Nahunta Site (Wayne County)* – 15.5 BMU and 76,000 pounds of nutrient reduction credits associated with riparian buffer restoration

(c) *Marston Site (Jones County)* – 7.4 BMU and 74,000 pounds of nutrient reduction credits associated with riparian buffer restoration

EBX Forest Banks

Maryland

(ii) *Winkler Farm* – 34 acres of forest restoration credits (completed 2000)

(iii) *Chase Farm* – 12 acres of forest restoration credits (completed 2006)

EBX Endangered Species Projects

South Carolina

(i) *Carolina Heelsplitter Conservation Bank (Lancaster County)* – EBX developed an umbrella endangered species conservation bank for the Carolina Heelsplitter mussel with a service area covering both North and South Carolina on 811 acres of land (permitted 2009).

West Virginia

(i) *Thunderstruck Conservation Bank (Randolph County)* – EBX is spearheading a 600 acre endangered species conservation bank on 2,000 acres of land for the Cheat Mountain Salamander and the West Virginia Northern Flying Squirrel (permitted 2009).

EBX Environmental Asset Management Projects

South Carolina

(i) *Westvaco Project* – Consulting assignment to identify and assess potential assets on 500,000 acres of professionally managed timberland (completed 2000).

Louisiana

(i) *Climate Trust* – EBX worked with Ducks Unlimited (2006) and Environmental Synergy (2007) in proposing carbon sequestration on properties in Louisiana and Mississippi (including the Tensas River National Wildlife Refuge) to provide carbon offsets under the Regional Greenhouse Gas Initiative ("RGGI") and the Oregon Climate law (2005-2006).

(ii) *Wetland Accretion and Restoration/Carbon and Water Quality Credits (Pilot Proposed to Forest Trends and the Ecosystem Marketplace)* - EBX worked with Comite Resources in developing a proposal on projects in Louisiana to be used for wetland assimilation of treated waste water and carbon accretion. These projects were in Franklin, Iberia, and Luling and potentially included Mandeville (proposed 2007, funding is still pending).

<u>North Carolina</u>

(i) *PCS Phosphate* – EBX entered into two phase contract. Phase I entailed EBX producing a framework to assist with identifying and prioritizing sites for over 2,500 acres of wetland mitigation, 60,000 linear feet of stream mitigation and 228 acres of riparian buffer mitigation. Phase II, if pursued, would involve EBX performing turnkey mitigation, if PCS decided to proceed with the project (Phase I - completed 2007).

(ii) *ABC Cement Company* - EBX is assisting large Cement Company in integrating mitigation/conservation objectives into permit decision making. This includes the concept of promoting advanced mitigation concepts into the EIS and Army Corps permit process. Phase II, if pursed, will involve the development of large – scale mitigation banks (initiated 2008).

(iii) *Holding Property* – Identified and assessed environmental asset for client, and ultimately negotiated the sale of asset to satisfy regulatory objectives (completed in September 1999).

<u>Great Lakes</u>

(i) *Great Lakes Protection Fund* – EBX was hired to promote market-based policies through-out the Great Lakes that would result in water quality improvement projects. EBX worked in Wisconsin, Illinois, Indiana, Ohio and New York. (2005-2006).

<u>Chesapeake Bay</u>

(i) *Fund for Water Quality* – EBX is serving on advisory committee for voluntary fund initiated to acquire water quality credits in the Chesapeake Bay. This Fund is being spearheaded by Forest Trends, the World Resources Institute and the Chesapeake Bay Foundation (initiated 2008).

(ii) *Bay Bank* – EBX serves on management / operations committee of an entity that is proposing to provide a spatial registry for both supply and demand of ecosystem credits (initiated 2008).

<u>World Wildlife Fund</u>

(i) *Water Neutral Offsets* – EBX analyzed with other team members world-wide water offsets programs, including water quality and quantity programs in the US (completed September, 2008).

<u>Maryland</u>

(i) *EMA (Carroll County)* – Consulting assignment to identify, value and negotiate water rights for a non-profit organization (completed 2000).

(ii) *EMA (St. Mary's County)* – Consulting assignment to assist a non-profit organization assess forest resources on donated property (completed 2001).

(iii) *Talley Farm* – Consulting assignment to assess development and conservation alternatives for a family farm (completed 2001).

EBX Environmental Investment

Virginia

(i) *Chesapeake Environmental Bank* – EBX is working for landowners on the development of a 1,146 acre wetland mitigation bank and in obtaining a financial commitment for acquisition of the bank. EBX developed and is finalizing the Mitigation Bank Instrument (2007 – present).

Louisiana

(i) *Paradis Bank* – EBX evaluated investment in Paradis Bank owned by Chevron. No agreement was reached (2005 – 2006).

Idaho

(i) *Green Ranch at Lake Cascade Environmental Bank* – EBX was engaged to assist with MBI development and to make and/or obtain an investment in a 2,000 acre stream and wetland mitigation bank (2008 – present).

Florida

(i) *5 Northeast Florida Mitigation Banks* – EBX represents landowner / bank sponsor in seeking investment in five fully-permitted mitigation banks in Northeast Florida (initiated June, 2008).

World Bank

(i) *Prototype Carbon Fund* – Served as an agent for a consortium looking to invest in the World Bank's Prototype Carbon Fund (completed 2000).

Sustainable Land Fund

(i) *MMASLI* – EBX founded the Sustainable Land Fund, which was ultimately acquired in 2007 by MuniMae, and was renamed MMASLI. EBX retains a strategic relationship with SLI.

4.3 Professional Staff

Environmental Banc & Exchange, LLC

Randy Wilgis, President,

(b) (6)
[redacted]

George Kelly, Director and Founder,

(b) (6)
[redacted]

Thomas Rinker, Chief Operating Officer,

(b) (6) [redacted]

Norton Webster, Senior Project Manager,

(b) (6) [redacted]

David Godley, Project Manager,

(b) (6) [redacted]

PBS&J

Jens Geratz: Project Manager

(b) (6)

[redacted]

Michael Gloden: Task Manager

(b) (6)

[redacted]

Elizabeth Scherrer: Project Monitoring

(b) (6)

[redacted]

4.4 References

Environmental Banc & Exchange, LLC

U.S. Fish & Wildlife Service-Region Four Headquarters
Endangered species conservation banking
Contact: David Dell (843) 727-4707 x226

U.S. Fish & Wildlife Service-Washington, DC
Species Listing Division (formerly was in FWS-Charleston field office)
Contact: Lora Zimmerman (703) 358-2499

U.S. Army Corp of Engineers-Charleston District
Project mgr for the Georgetown, SC Airport mitigation
Contact: Nat Ball (843) 329-8044 x-8047

Katawba Valley Land Trust
Conservation partner for the Flat Creek Natural Heritage Preserve
Executive Director: Lindsay Pettus (803) 285-9455

PeeDee Land Trust
Conservation partner for the Pee Dee watershed
Executive Director: Jennie Williamson (843) 661-1135

The Nature Conservancy-South Carolina
Aquatic Program Manager and Director of Science and Stewardship
Contact: Eric Krueger (843) 937-8807 x-16

North Carolina Ecosystem Enhancement Program and NC-DOT:
Awarded contracts for thirty-one ecosystem mitigation projects with a total contract value in excess of $61 million
NC-EEP contact: Jeff Jurek (919) 715-1412, Guy Pearce (919) 715-1656
NC-DOT contact: Bruce Ellis (919) 715-1418

Lancaster County, SC
Development of local ordinance to address endangered species issue (Carolina Heelsplitter), enabling economic development to move forward
County Administrator: Steve Willis (803) 416-9300

The Nature Conservancy – Virginia Field Office
Sale of Upper Rappahannock Wetland Mitigation Bank
Contact: Linda Crowe (434) 951-0577

The Nature Conservancy-West Virginia Field Office
Endangered species conservation bank and conservation financing
Contact: Rodney Bartgis (State Director) (304) 637-0160

PCS Phosphate
Stream and wetland mitigation planning for major mining facility expansion in North Carolina
Contact: Jeffrey C. Furness (252) 322-8249